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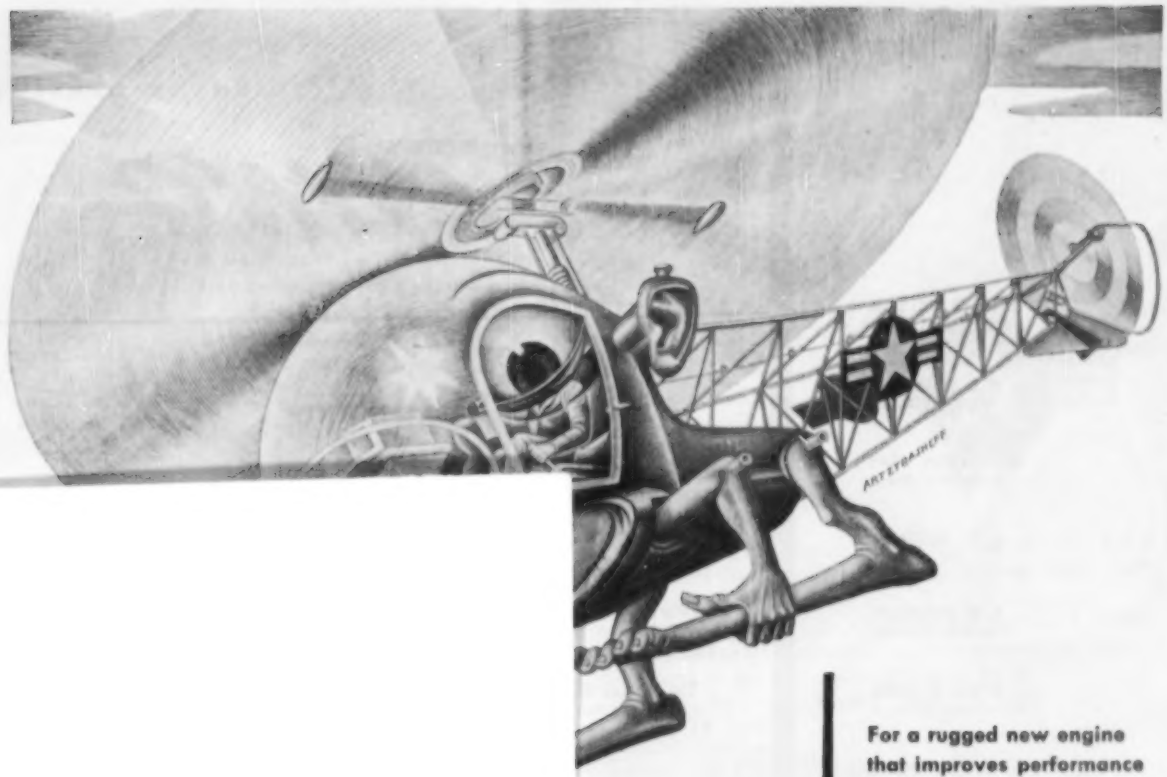

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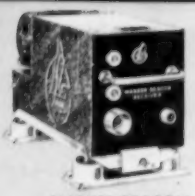

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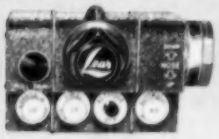

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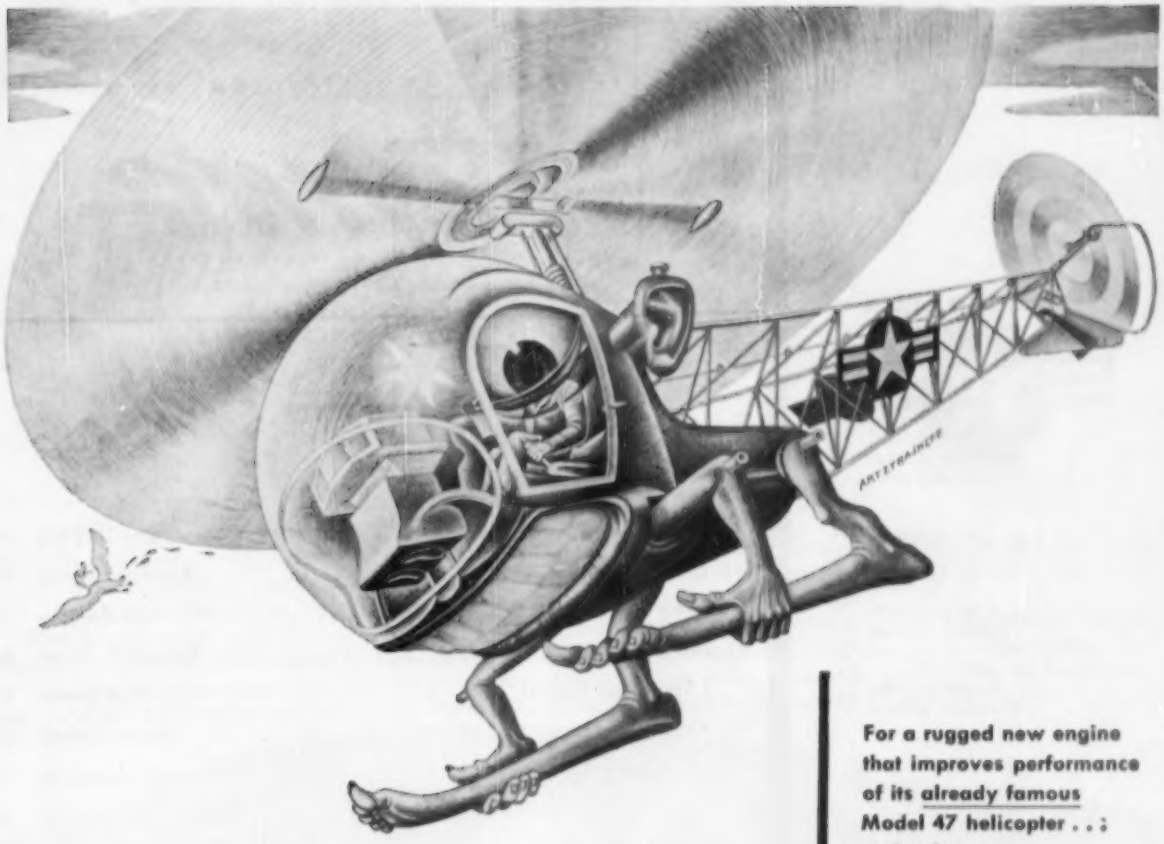

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FLYING

Reg. U. S. Pat. Off.

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THE COVER: First of the jet trainers—Cessna's twin-jet XT 37. See articles on pages 16 and 32.

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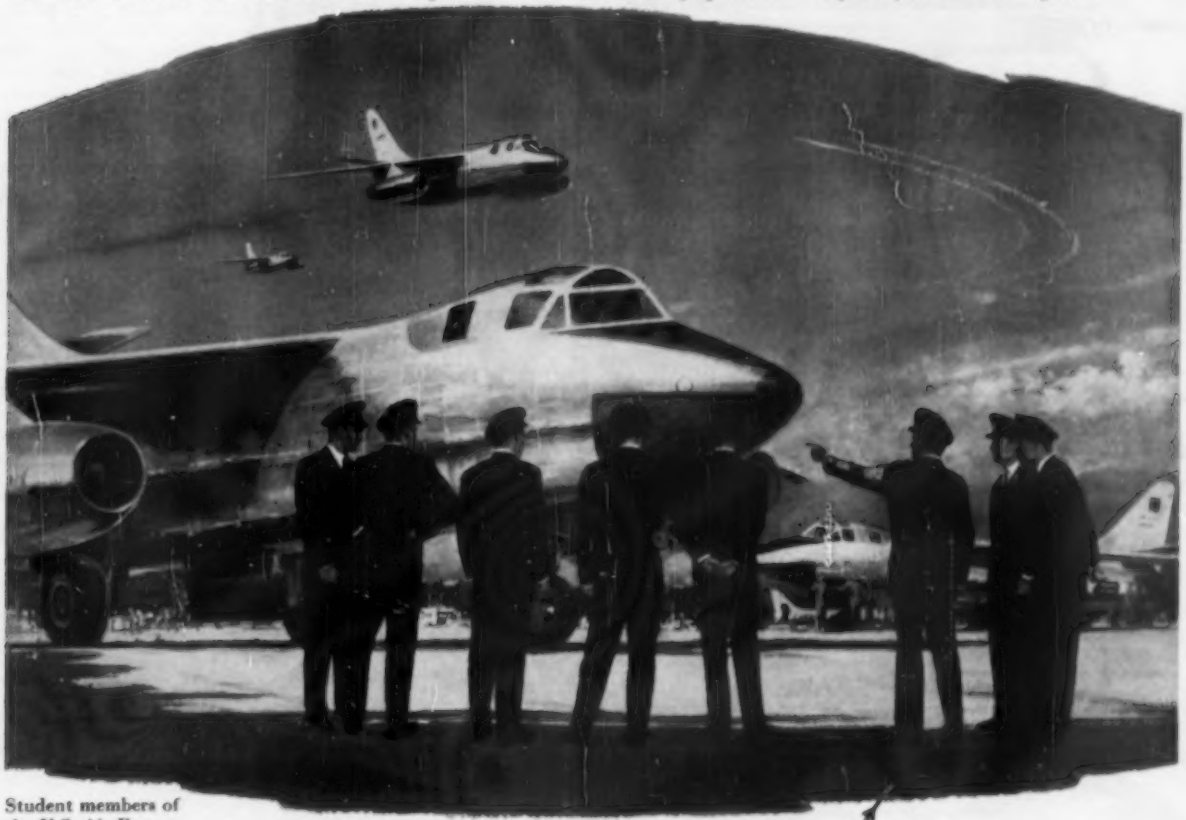

Student members of the U.S. Air Force study a Douglas RB-66

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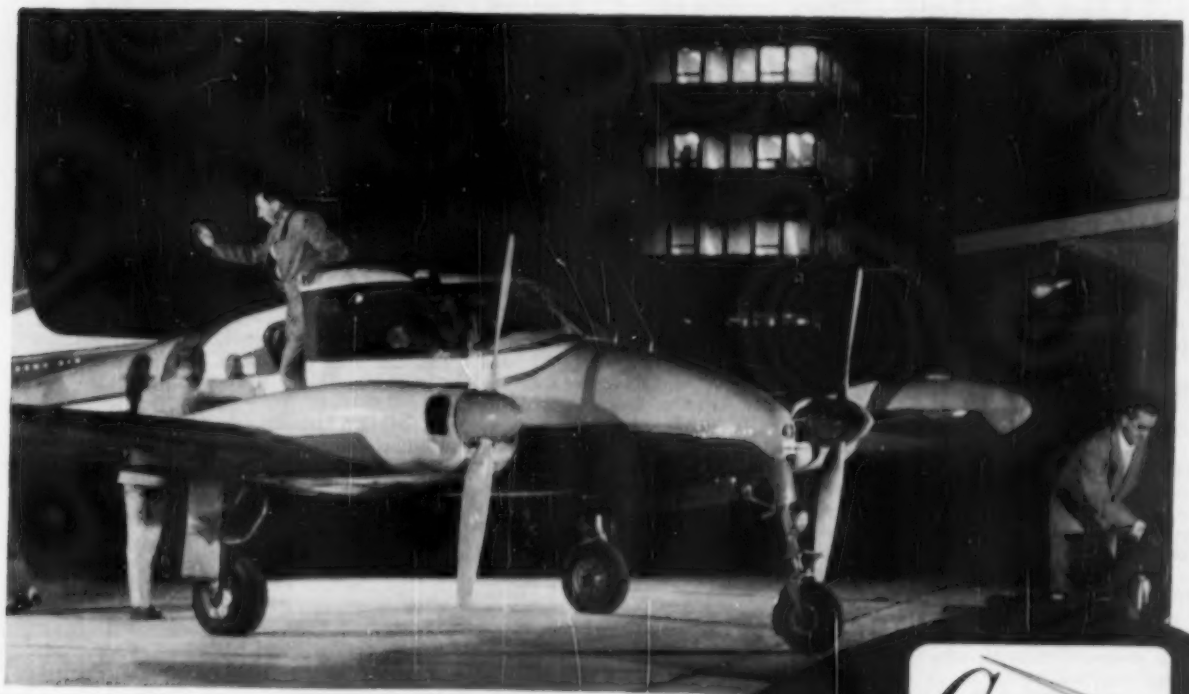

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MAIL BOX

FLIGHT INSTRUCTORS

. . . I would like to see an article dedicated to my fellow flight instructors who are really conscientious in teaching safe flying practices, bolstering the timid, checking the boisterous and trying their best to promote the growth of the "grass roots", with but little remuneration but with lots of love for flying.

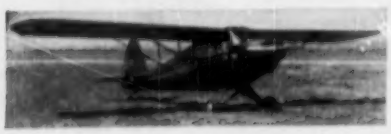
JOHN E. CARLSON

Bay City, Mich.

● *We agree that the flight instructor is too often the forgotten man of aviation. You will be happy to see at least one phase of his case presented in this issue.* —ED.

PORTERFIELD

In your April issue you ran an article called "Bunkhouse Ballad". I would like



to see a picture of a Porterfield similar to the one in the story.

WM. C. EDWARDS

Horse Cave, Ky.

MEMO

The article that Lew Johnston wrote which appeared in the December issue, "To File or Not to File" (a flight plan), was very interesting. I would, however, like to report for the record that the Airway Station at Rodeo, N. M., was closed on January 6, 1954.

I would also like to "second" G. J. Wakefield's remarks (Dec. Mail Box) about Jim Galvin. Not too long ago I had to land at Renton, Wash.—too much "stuff" at Boeing Field. Jim sent his Willys Jeep over and picked me up—no charge! What the Av Biz needs is more folks like Jim.

BILL BRENIMAN

Los Angeles, Calif.

COURTESY HAS MANY FRIENDS

In your November Mail Box, Lt. R. T. Davidson of Norton AFB, Calif., wrote you about Joe Butnor, who operates the Everglades Flying Service at Palm Beach, Fla. He lauded Joe's relationships with his customers and I for one can also vouch for his exceptional amiability and helpfulness.

This past summer I was returning from Maine and was weathered in at Fall River, Mass., where Joe has an operation to Cuttyhunk, Block Island, Cape Cod, etc. We were made to feel very much at home, with every courtesy extended that could possibly be offered. The following day when we left, we were not leaving a commercial operation, we were leaving friends.

Hurricane *Carol* did Joe in on one of his planes. However, I am sure that by this writing he will be operating once again at Palm Beach. It is my personal recommendation that if any seaplane pilot is in the area he ought to get acquainted.

ARTHUR LEIBOWITZ

Flushing, N. Y.

WHY ICE?

Your article on aircraft ice by J. R. Hoyt in the December issue is very interesting and theoretically correct. However, in 1946 I demonstrated to a group of students that *three different* 65-hp Continental engines in Piper *Cubs* would quit cold in flight under severe carburetor icing conditions if full heat were applied and left on.

Proper technique under those conditions is on-and-off repeated at short intervals until the engine will run with the heat in the "on" position. Removing severe carburetor ice all at one time under certain conditions is just too much water and can result in forced landings. Turning the heat off for a short interval allows the engine to regain rpm before further application.

JACK HAWKS

Yazoo City, Miss.

. . . Mr. Hoyt speaks of checking with the weather station on icing and then figuring out the height of the freezing level yourself, using the general rule of the temperature decreasing about 3° F. per 1,000 feet, except in the case of inversions or frontal conditions.

The rule he quotes is a good one to use in the absence of any other information, but since it is a general rule, subject to many limitations, it should not be used if specific information is at hand.

The area aviation weather forecasts which the U. S. Weather Bureau issues each six hours or oftener, when necessary, and which are available at all U. S. Weather Bureau airport stations and CAA communications stations, contain a section on the height of the freezing level and indicate the levels and areas where pilots can expect icing.

CARL M. REBER

Alexandria, Va.

TECHNICAL WRITING

Thanks. That detailed well-written account about night flying (Nov. issue) by Ted Durosko will probably be picked up and reread many times by pilots and students everywhere. Most of my reading during the past 15 years has been technical, so I greatly appreciate Mr. Durosko's fine article. Good technical exposition is rare and badly needed.

L. M. DUNN

Parma, Ohio

OLDEST FLYING CLUB

I am a member of the Thunder Bird Flying Club which was organized Oct. 22, 1933. Our first airplane was a Buhl *Bull Pup*, bought by Kelsy Gault, Gordon Rohr and the other two members of the club.

During the past 21 years the Thunder Birds have had five airplanes. The fifth and present plane is a Bellanca.

To the best of our knowledge, we are the oldest active flying club in Maryland and would like to know how we stand in the other 47 states. That is, clubs which purchase an airplane from club membership only.

RICHARD H. TOWNSEND

Baltimore, Md.

● *Let us hear from some of the older flying clubs. Can any boast a 21-year continuous history?* —ED.

SPORTS CAR?

I am a reader of car magazines and for some time now I've been reading FLYING which I find most interesting. My main idea in writing you is to clear up an error you made in the article "Pan-American Road Race" (Dec. issue), where you inserted a picture of a wrecked Lincoln. It

says: "A big sports car which didn't make it in the 1953 race". As you may know, Lincoln hasn't yet come out with *any* sports cars. You may also be interested to know that the only American-made cars entered as "sports cars" in the 1953 Pan-Am road race were a Packard, a Chrysler and a hot rod with an Olds engine.

ANGEL ODRIOZOLA ELIZONDO

Monterrey, N. L.

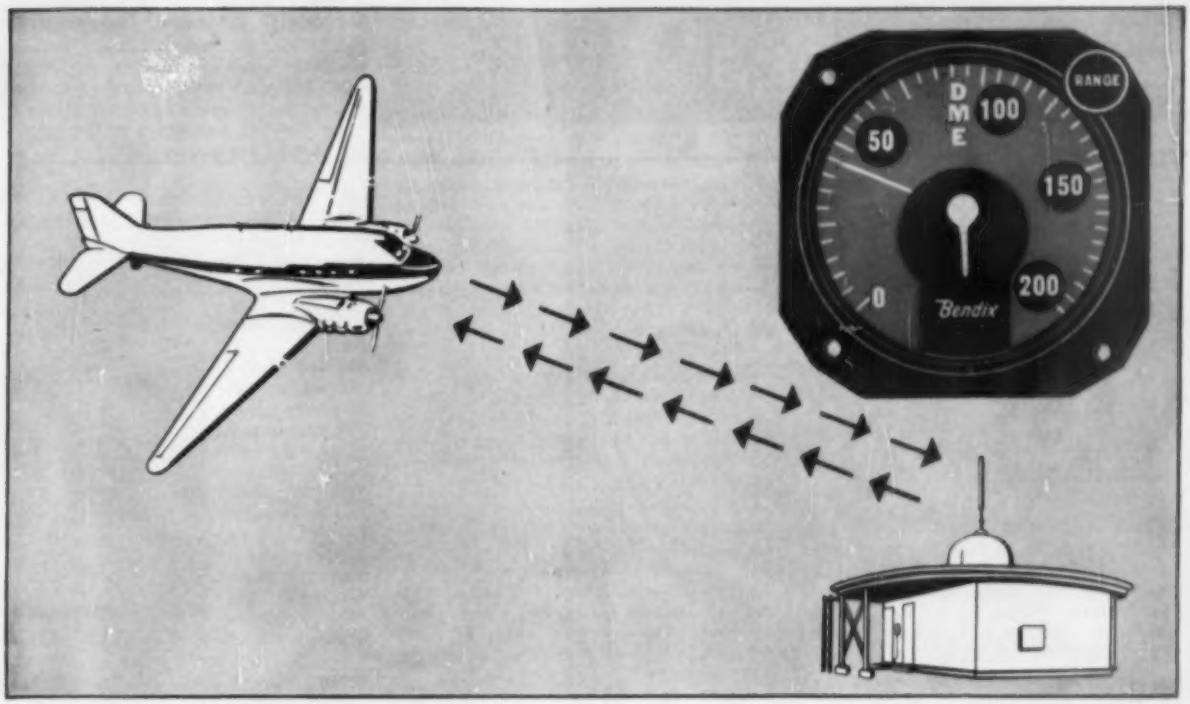
BEST FEATURES

In my opinion FLYING is the best aviation magazine I have seen on the market today. The two features I enjoy most in your magazine are: "I Learned About Flying From That", and the editorial each month by Gill Robb Wilson.

LARRY CLIFTON

Charlotte, N. C.

● *Mr. Clifton's letter is carried here, not because we like to boast a bit, but rather in the hope that other readers will follow suit and drop a line to let us know the articles and features they like best.*—ED.



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Briefings . . .

FIRST CATALOGUE of the U. S. Air Force Academy is now available. Contents include complete curriculum of the four-year course, details concerning appointments to the Academy and sample entrance examination questions. Copies may be secured from: Air Force Academy, Headquarters, USAF, Washington 25, D. C.

PLANS FOR THE MIAMI International Aerorama, to be held at Miami International Airport, January 19 through 23, include a large static exhibit of aircraft, performance flights of various jet aircraft, and formation flying by the Air Force "Thunderjet" team.

MET-CO-AIRE has developed and are now ducing an Ercoupe quadrant casting which has CAA approval. Installation of the quadrant will eliminate cable fraying hazard and mandatory 50-hour inspections. The part retails for $5.85. Met-Co-Aire is located at the Municipal Airport, Fullerton, Calif.

MORE THAN 7,800 persons are employed at LaGuardia Airport in New York. The annual payroll is $36 million.

MANY AMERICANS HAVE NEVER even heard the names of the nation's 14 local service airlines, but last year these small air carriers flew the equivalent of more than 1,830 trips around the world, carried almost two million passengers, and served 440 cities in 42 states. Some 260 of these cities receive their only air service from the local carriers. Average flight is 74 miles, compared to 234 miles for trunk lines.

SPOTTING AIRCRAFT is a hobby of thousands, and vital skill for the military services and Ground Observer Corps. Britain still leads the field in publication of aircraft recognition manuals. Latest

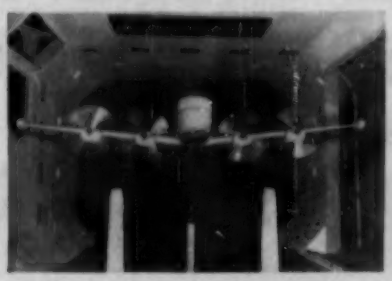
edition of C. H. Gibbs-Smith's book contains over 200 types of civil and military aircraft of many nationalities. It is available in the United States for $2.50 from John de Graff, Inc., 64 West 23rd St., New York 10, N. Y.

ANY ATTEMPT TO FIX the characteristics of tomorrow's helibuses must be preceded by a realistic determination of the size and location of the city heliports they plan to use. This is the concensus of opinion of the international working group of commercial helicopter operators who met recently in Montreal under IATA auspices.

THE B-29 HAS BEEN RETIRED from combat duty in the Pacific. The fighting superfort that inflicted greater damage to the enemy than any bombardment aircraft in the history of the world is being replaced by B-47's.

VETERAN AVIATION WRITER Edward L. "Swanee" Taylor has been awarded the Diploma of Honor of the International League of Aviators. Pilot, instructor and master of ceremonies at many national aviation events, he was for many years editor and writer on national aviation magazines.

FOR ITS WIND TUNNEL TESTS Cessna's Model 620 four-engine executive plane was put through its paces in the wind



tunnel at the University of Wichita. A mahogany model weighing 250 lbs., six feet in length, was built for the tests. Four water-cooled, 12-hp electric motors are housed in the life-like nacelles.

OWNERS OF SMALL AIRCRAFT have been warned by CAA to beware of carbon monoxide. In most small planes, cabin heat is obtained by flowing air around the hot exhaust manifold, then through ducts to the cabin. Corrosion of the manifold can cause pinholes, permitting dangerous concentrations of carbon monoxide to reach the cabin. Regular inspection every 25 to 50 hours of the manifold and adjacent ducts is recommended.

QUANTAS EMPIRE AIRLINES has purchased four 7-passenger de Havilland *Beavers* for scheduled operations in New Guinea. Cast in a role particularly suited to the *Beaver*, they will be used for opening up otherwise inaccessible territory. *Beavers* are now operated in 33 countries.

INSTINCT-GUIDING "feel" is restored to the power rudder control system of Convair's F-102 by a new pneumatic pressure regulator valve designed by Air Associates. Although enabling instant response at supersonic speeds, power controls reduce physical indication to the pilot of his control movements.

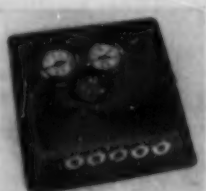
A MONUMENT TO THE PIONEERS who flew powered aircraft to and from Governors Island in New York harbor between 1909 and 1916, was dedicated on Dec. 17th. Erected under the auspices of the Early Birds, an organization of those who flew solo before Dec. 17, 1916, the monument has a bronze propeller which was cast from one of the Wright brothers' wooden props. First flight from the island was a round-trip to the Statue of Liberty in 1909 by Wilbur Wright.

A DC-3 NOW HANGS in the Smithsonian Institute alongside the Wright brothers pusher and Lindbergh's *Spirit of St. Louis*. Between December 7, 1937, and September, 1952, it flew 56,782 hours.

MAX CONRAD'S NON-STOP New York to Paris delivery flight of a Piper *Apache* was made without special equipment other than three cabin tanks with combined added capacity of 288 gallons, and installation of system for adding engine oil. Leaving Idlewild at 11:27 a.m. Nov. 6, he arrived in Paris at 9:50 a.m., eastern standard time, Nov. 7. Total time en route was 22 hours 23 min. Distance was 3,625 miles, average speed 161 mph. Gross load at take-off was 5,000 lbs., a 1,500 lb. overload. Take-off distance was 2,500 feet with a 6 to 8 mph cross-wind.

WIND WHISTLING OVER wings and fuselage of planes at today's top military speeds is 10 to 12 times greater than any hurricane ever recorded.

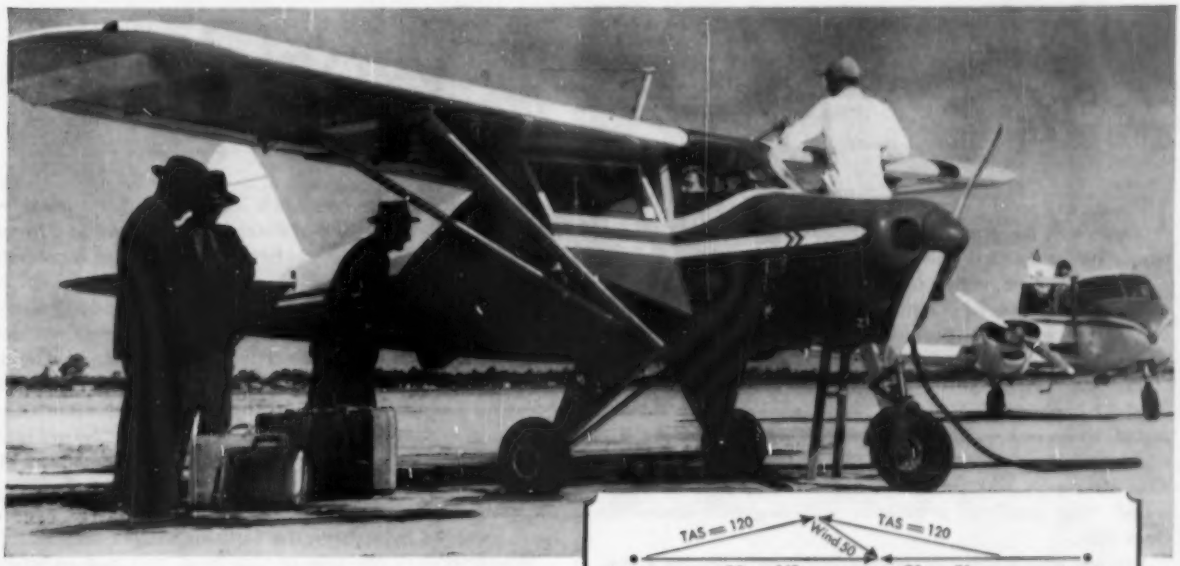
A LIGHTWEIGHT OXYGEN console system has been developed by Scott Aviation Corp., of Lancaster, N. Y., for installation in single and multi-engine business aircraft. Console weighs three pounds, is installed anywhere in cabin wall, with oxygen cylinders in baggage compartment. Console has high pressure on-off valve, regulator and 5 outlets. Typical installation cost including console, mask kits,



(Continued on page 61)

FLY WEATHER-WISE

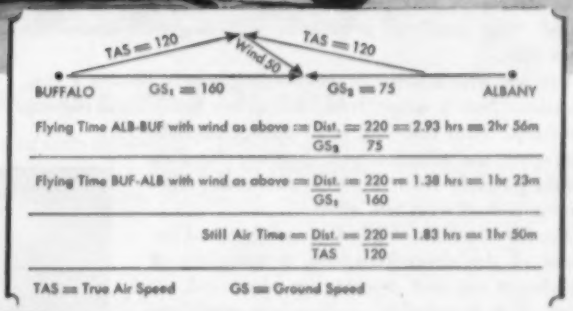
[These weather items prepared in consultation with the United States Weather Bureau]



It pays to keep a reserve supply of fuel in your tanks.

For instance: You lose more time flying from A to B against a headwind than you regain in the same wind returning from B to A. This is because the headwind acts on you longer than the tailwind does.

The example at right illustrates how you may lose 1hr-6m flying from Albany to Buffalo, but only pick up 27 minutes returning from Buffalo to Albany with the same wind.


TAS = 120
Wind 30
TAS = 120
BUFFALO
GS1 = 160
GS2 = 75
ALBANY
Flying Time ALB-BUF with wind as above = Dist./GS2 = 220/75 = 2.93 hrs = 2hr 56m
Flying Time BUF-ALB with wind as above = Dist./GS1 = 220/160 = 1.38 hrs = 1hr 23m
Still Air Time = Dist./TAS = 220/120 = 1.83 hrs = 1hr 50m
TAS = True Air Speed
GS = Ground Speed

Flying across country on a clear, still night, the initial formation of *ground fog* may often be detected by the fuzzy, blurred appearance of lights in low spots where the air is nearing saturation. This may be followed shortly by dense ground fog lasting until after sunup in the morning. Don't get caught too far from an airport when you see these signs of fog.

Warning: Lights on *high* ground may not appear blurred, even though ground fog is forming at lower, damper spots and will soon spread to these higher elevations.

Best Pair to Get You There

WHEN ALOFT it's comforting to know that you have taken every precaution on the ground before take-off. Selecting the right aviation fuels and lubricants is mighty important "ground work." The famous Flying Red Horse aviation products have the approval of every major aircraft builder...surpass the rigid specifications of the Army and Navy...have been a first choice among leading pilots and pioneers since the Wright Brothers. Insist on Mobilgas Aircraft and Mobiloil Aero in your plane.

Mobiloil AERO

Mobilgas AIRCRAFT

SOCONY-VACUUM OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

FLYING
VOLUME 56, NO. 2
FEBRUARY, 1955

AN EDITORIAL

This Gray World

IT'S a gray world—not black or white—but gray. And especially its grayness poses problems for Americans whose background is one of forthrightness.

We know how to live in peace. We know how to fight wars. But this world is neither at peace nor at war—or if you prefer, is both at peace and at war. And buried in its grayness is the fate of civilization.

The harassed frontier marshal of old Abilene at the end of the Chisholm Trail had a simple answer. The line of action was clear in his day. He planted himself in the middle of the street and beat the bad man to the draw. The aftermath was simple also for the undertaker. He rolled "Big Red" in a blanket and dug him under on Boot Hill.

But we, who inherit all this forthrightness, live on a new frontier. Not a single trail, but every trail, ends on our doorstep. And our Colt is a hydrogen bomb. Moreover the aftermath of shooting Big Red would possibly lead to worse confusion than trying to deal with him alive.

So, for the sake of good conscience and because of the sheer economic proportions of fighting a war and cleaning up afterward, we must, if it is possible, temper our traditions to our future.

Now we of the rank and file could shrug this off as the job of the present man from Abilene and his deputies and undertakers at the national policy level. But I don't think they alone have the answers to this gray world. I think we individual citizens, each in our own sphere of experience, must gear our decisions and form our judgments with a greater end in view than self-centered aims. It is the aggregate of all this that will find the right path in the grayness . . . invincible strength tempered with infinite patience . . . the toughness to live with uncertainty, yet not ourselves to become uncertain.

I sometimes wonder if the average citizen realizes how truly important he is . . . how inevitably his or her decisions eventually accumulate with others to affect history on the international plateau, although they do not seem in themselves to have any such connotation.

For example, somebody is always trying to get me to narrow down the scope of this magazine . . . "more private flying" . . . "more military articles" . . . more this or less that, ad infinitum. Sure, it's the way to woo popularity. Sure, it's the way to compile a lot of smooth statistics for an advertising agency. But I happen to know that a broad public understanding of air power, and an ever increasing public use of aviation is one of the values essential to strength in this gray world. So I have to decide to whale away on the broad basis—everything from getting our kids into the air to pointing out that Red China aims at being the world's third largest air power. No, I can't reach millions but I reach hundreds of thousands every month and they can reach millions if they have the word. So my little decision, and little ones like it, made at the rank and file level, if they are made with the thought in mind of serving the particular needs of this gray world, may determine fate. And we must have the faith to believe they will.

Scattered over the face of this land, and now in mufti, are thousands of valiant airmen who, once in uniform, served their nation magnificently. Flanking them are thousands of other pilots who in one way and another have distinguished themselves as Americans. Yet I doubt if the past service of any of them can exceed in significance the potential for service which lies now at hand.

I am entirely sympathetic with introducing public school teachers to the air age; with indoctrinating youth in the school room; and with all the efforts made by industry through scholarships. But if I could have my choice in these gray days, I would choose to fire the enthusiasm of every existing airman of America to the point where he launched personal crusade for a cause he understands.

Many chores need doing. Bring the attention of superior young men to the Air Force Academy. Concern yourself with the closer relations of your community and the nearby Air Force Base. Explain to your neighbor how international cooperation among free nations has reached its highest achievement in the field of air transport. Don't let your community airport be sold down the river for a real estate killing.

But why should I enumerate a hundred and one chores? The gist of it all is that the grayness of our world must not be permitted to generate frustration within us. We can't call the bad man out and have a showdown as of yore. But that doesn't mean we can't handle him. It just means that it must be done in a different way . . . strength lubricated by patience . . . faith geared to selflessness.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher

America's Finest Fleet

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Used by American for Aircoach as well as Flagship service, the "6's" are America's most-popular long-range transports.

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With the Convair, American offers short-hop passengers the speed and comfort of a long-range transport.

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Largest and fastest cargo plane, the DC-6A enables American to offer next-day delivery on East-to-West coast shipments.

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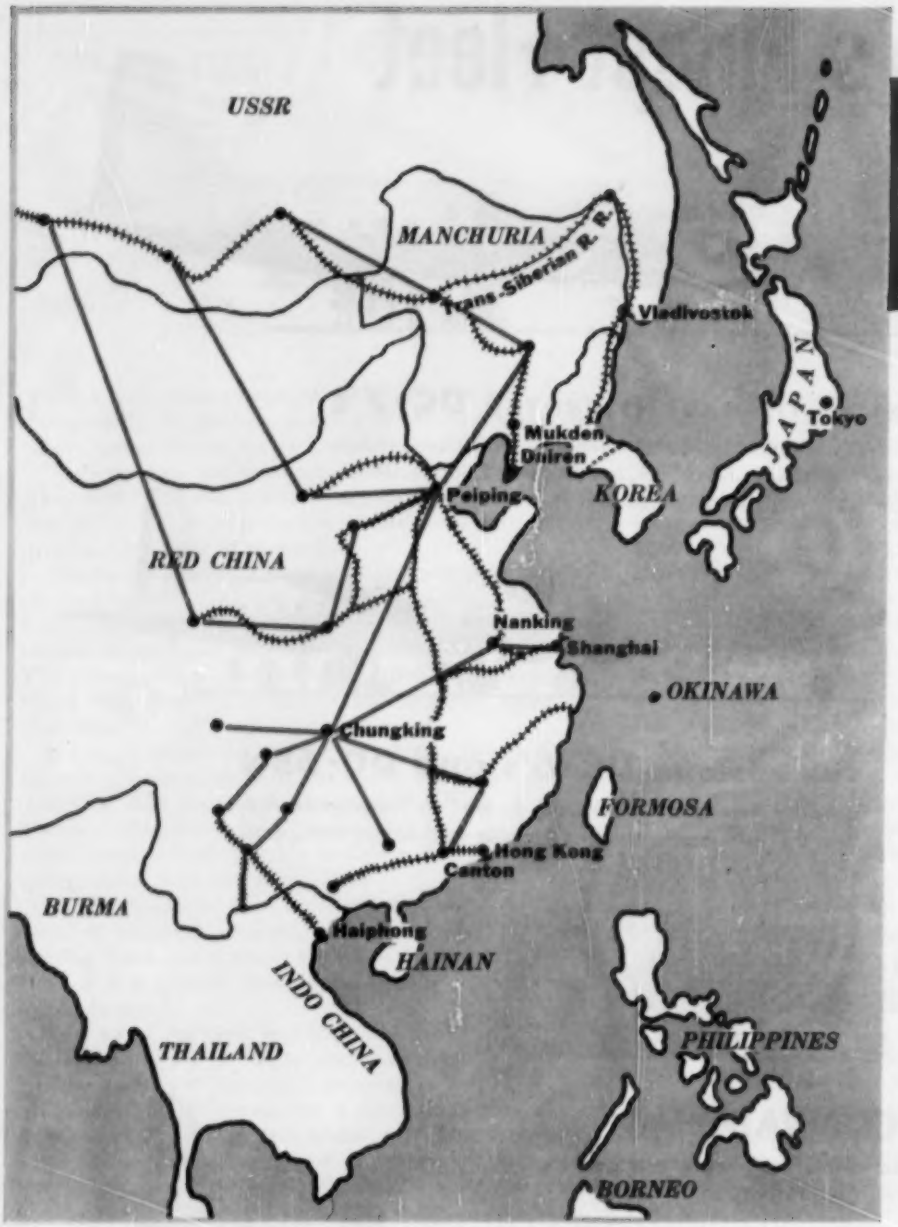
Red



Mao's air power as a world force would dominate Japan, Formosa and the Philippines . . . driving United States perimeters from the Pacific. Rail and air transport routes as shown on the map were China's bottleneck but are now rapidly expanding.

By
COLONEL BEN C. LIMB
Ambassador, Republic of Korea, to the United Nations

Reported by
TOM McCLARY

EXPERTS HAVE KNOWN FOR CENTURIES that Formosa is the maritime key to Asia. Only in 1950, however, did a startled free world recognize Korea as the air gate to Pacific horizons.

The free world closed that gate to the Red tide by the bloody Korean war; and at particular cost to the American people. Now the gate is being swung open again by lack of realistic evaluation, firm decision, and effective military aid in time and on time.

Should American policy decide upon complete withdrawal of present air protection of Korea, the people of that land will face wave upon wave of MIG's. And should Korea drown beneath these waves, all of Pacific Asia will be immediately vulnerable. United States command of Pacific airways will be challenged and her effective security perimeter driven sharply back to Pearl Harbor.

This result is the immediate objective and defines the scope of the Kremlin's air program for Red China.

We in Korea know this all too well. We have felt the bite of Russian imperial ambitions since Czarist days. We knew before 1950 that our strategic geographical position would make us a target of Soviet conquest. Possibly even better than the Formosans, we understand Soviet determination to control the Pacific as a fundamental prelude to isolation of, or attack upon, the United States.

Formosa has three advantages. In the first place it is protected against attack by a direct military commitment of the United States. Even though it is a government in exile, it possesses its economic integrity as a whole and self-sustaining unit. Secondly, Formosa is an island stronghold, well able to withstand long siege, and in any case costly to conquer. And finally, except for obvious political reasons, Formosa could be temporarily by-passed in the Soviet's Red China pincers plan.

Overcast in the Pacific

Communist China, tool of Soviet imperialism, aims to create the world's third greatest air power.

Korea, on the other hand, is protected only by American friendship and a variable estimate of its specific military value. The United Nations, toward which Korea led all Asia in placing so much hope, completely failed us when confronted by the sword rattling of Soviet manipulated Red China. Our land was divided by an arbitrary, foreign-assigned, political line which effectively destroyed our economic existence. We can never be self-sustaining unless that line is erased and our territory again unified. Without control of the Yalu, the Republic of Korea has no defense from the Red mainland. We can be attacked by land, by sea, by air; but as well by economic starvation and infiltration, unless the ROK Army, Navy and Air Force are better equipped, and unless our economy is made self-sustaining by erection of industrial plants.

They are not dissident Koreans but rather Red Chinese who hold our industrial arsenal in the north . . . a million-man army of them. They have fortified our native hills against us and in those hills have built 13 modern air bases from which to hurl their MIG's south. Behind these forts and air bases lie the vast resources of Manchuria . . . railroads, supply dumps, airports.

Mao's Red China army numbers five million, of which one-fifth are seasoned, well-equipped veterans. The rest are unreliable, so Mao dare not risk concentration of his first-line troops as formerly. If he did so, Korea and Chiang Kai Shek could squeeze him to death in short order.

In the air, however, due to the Kremlin drive to rush the Red China air power program to completion, the picture of Mao is something different.

To begin with, the Soviet itself maintains 23 air divisions in the Far East. They number 69,000 men and 3,400 planes. Additionally they have three paratroop divisions of 9,000 men each, with their own supporting airlift. Also the Soviet Far East Navy has 1,300 aircraft. In 1953, Russia gave Mao almost 37½ billion rubles air credit, in addition to 759 aircraft for basing in northern Korea and other strategic spots. Mao gets the latest fighters Russia produces, and receives an estimated 10 per cent of total Soviet output. The Soviet Air Advisory Commission to Red China alone numbers 20,000 Russians. Mao's best pilot prospects are topped off in fighter tactics in Russia.

Minister for Foreign Affairs for the Republic of Korea, Colonel Limb was named Chief of Korea's U. N. Mission in 1950.

At this writing, Mao himself already has 6,300 combat-ready pilots, 90,000 paratroopers, and a network of 9,500 communications experts. The MIG 15 to date has been the standard fighter plane but MIG 17's are now being phased into squadrons. Red China's air force is rapidly being built to third world position!

Why is such a globally significant air force being built? What objective can justify such an outlay by the Kremlin? Certainly not the defense of Asia! No, there is no logical answer to Red China's Soviet-planned world position in military airpower than intended destruction of American perimeters in the Pacific. True, the master plan is yet in skeleton form, but even so Russia has already built 12 huge air bases in Manchuria, 5 in northern China, 18 in eastern China and 15 in southern China.

These bases in themselves are subjects of interest. In many respects they are the world's most modern . . . better than any in the United States or in Russia. Each base is surrounded by a network of auxiliary and diversionary fields. All are tied together by communications and airway facilities. All have steel and concrete runways and provision for infantry protection. Many have total underground hangars, shops and ramps for direct take-off from underground. Additionally, the military operation of these bases is tied directly into the logistic capacity of Red China's seven civil airlines, three of which run straight into Soviet Russia. Furthermore, the air program is keyed to the railroad network and is serviced by 341 strategically placed arsenals.

Separate and apart from Red China's air program pointed at Korea, Mao has 1,170 jets and some 1,100 other military craft in support. This totals a tactically offensive arm of no mean proportions and, beyond doubt, is pointed at the U.S. Strategic Air Force and its bases in the Pacific. Anyone who can read a map will see that creation of the Red China air bases gives the Soviet a complete line from within the Arctic Circle to the tip of Indonesia. No imagination is required to understand that the purpose is to checkmate the strategic importance of SAC bases.

Currently the Kremlin knows that no matter how withering an attack it poured against Europe or the United States, the retaliation from American Pacific air bases would be devastating. Addition of the Red China air program is to complete Soviet (*Continued on page 50*)

New training planes as well as new training concepts are necessary in developing pilots for our all-jet combat forces.

Training Keeps Pace

By RAYMOND WOOD

BUILDING TOWARD AN ALL-JET combat force and 137 operational wings by 1957, the Air Force annually needs 6,000 new pilots. Only the world's best training can produce the world's best pilots. The box scores of combat originate in methods and concepts of training.

In consequence of this indisputable fact, the training program of the United States military airman is eternally the subject of study, research . . . and change.

World War II cadets learned to fly in 90 mph PT-17's and PT-19's. Many started in lightplanes even before they flew PT's. Today's fledglings first sample flying in 170 mph, all-metal planes equipped with retractable tricycle gear, constant speed props, and flaps.

The most significant development of recent months is USAF's plan to use a jet trainer in primary, the first of three phases in the Air Force flying training program. The proposed jet is the Cessna T-37, winner over 15 other design proposals in a competition conducted by the Air Force. Powered by two Continental J-69 Turbomeca *Marbore* engines, this sleek side-by-side trainer is the first turbine-powered aircraft accepted for primary flight training.

During 1955 the prototype T-37 will be thoroughly tested at Muroc. If it meets all R & D requirements, it will be turned over to Air Training Command for further evaluation as a primary trainer. Cessna has an initial contract to build 11 of the jets for use in this evaluation.

Simultaneously under study for advanced training is the TF-86F, a modified version of the F-86 *Sabre*. Sixty-three inches longer than the MIG-killer, the proposed two-seat TF-86—along with a still secret aircraft type known only as "Project TZ"—is being considered as a replacement for the T-33, the current basic jet trainer.

Meanwhile, two new propeller-driven trainers with configurations akin to jet aircraft have already replaced older planes in four of USAF's nine contract primary flying schools. The other five schools will change types just as soon as additional aircraft become available. The new trainers are the all-metal, low-wing Beech T-34A *Mentor*, now in quantity production, and the North American T-28A, formerly used exclusively in basic and advanced training.

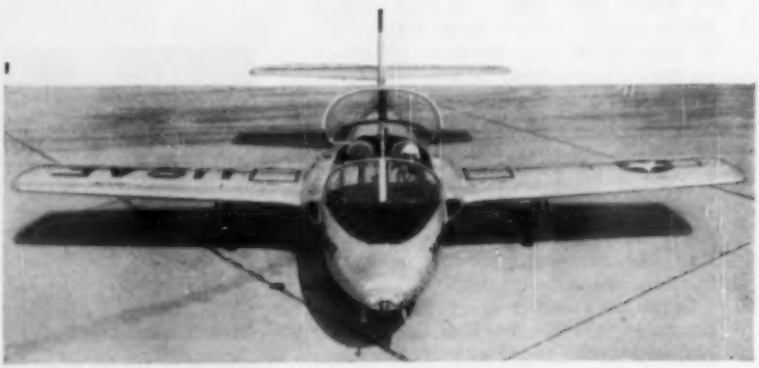
The T-34 replaces the Piper PA-18 and the T-28 takes the place of the bewhiskered T-6 *Texan* which finally is being retired after 17 years service in air training.

Under the old program, green students received 20 hours of so-called "flight screening" in PA-18's before climbing into the heavier, faster T-6, in which they flew 120 hours. In the revised primary program, embryo pilots will get 40 hours in the *Mentor* and 90 more in the T-28. Although primary flight time is cut from 140 hours to 130, students will be better prepared for basic, their next phase of training, due to easier transition from the *Mentor* to the T-28 and the jet T-33.

True, the newly graduated pilot must be capable of flying planes that yesterday would have been reserved for the "old heads" with long experience and vast technical knowledge. But gradual innovations in the whole concept of flying training have simplified flight instruction. Raw recruits are learning fundamentals in up-to-date planes which are much easier to handle than obsolete trainers.

Moreover, there is nothing exceptional about the mental

1



2

1

Slated as first jet primary trainer, Cessna's twin-jet XT-37 is now undergoing flight tests.

2

Designated a "trans-sonic trainer," evaluation of two-place jet TF-86 is near completion.

3

Primary flight training now begins in the Beech T-34, in quantity production for AF and Navy.

4

First new trainer since VJ-day, North American T-28 was also first to have a tricycle gear.

and physical standards for today's Air Force pilot. Contrary to widespread opinion, the jet pilot is not some kind of superman who must possess rare strength and endurance to fly the new trans-sonic and supersonic fighters. The jet age has brought about revolutionary changes in aircraft shapes and capabilities, but it hasn't altered the fundamental qualifications for the pilot candidate.

USAF's three-phase flying training today lasts about 15 months, excluding pre-flight indoctrination at Lackland AFB, Tex., where all aviation cadets and allied trainees undergo 12 weeks of academic, officer and physical preparation prior to entering the flight program. Student officers who are graduates of OCS, AFROTC units, and the service academies, go direct to one of the nine primary schools because of their previous military experience.

In primary the student learns the fundamental techniques of maneuvering, instrument flying, aerobatics, navigation, night flying and other procedures required of a military pilot. He can solo the new *Mentor* in eight hours, just as his predecessors did the PA-18, but after he finishes 40 hours of *Mentor* flying he can solo the big T-28 after only five hours of dual—or one third the minimum dual time formerly required to check out in a T-6.

Half of each training day is spent on the flight line, the other half in ground school where study of aircraft engineering, theory of flight, weather, navigation, instruments, and radio communications complement flying training.

After 24 weeks of primary, graduates are divided into two groups, progressing into the basic phase of instruction either as single or multi-engine pilots, depending on particular flying skills. If chosen to become a jet jockey, and about 80 per cent are selected for single-engine training, the student will fly 50 more hours in the T-28. However, since he has been thoroughly indoctrinated in the T-28 in primary, the trainee will (*Continued on page* 59)

Right: Called the *Flea* by builder George Frisbie of De Pere, Wis., this tri-plane is reported to have a top speed of 100 mph and cruise of 85. Engine is 65-hp. Builder says tri-plane is safer.

Below: Modifications on this former J-5 *Cruiser* include clipped wings with spill plates and a radically cut down fuselage with large rear window.

An upsurge of interest in

home built aircraft has CAA's blessing

and may well be pointing the way

TOWARD A PLANE

AVIDLY SEARCHING FOR A WAY to bring low cost flying to the public, experts in lightplane design are conducting a vast variety of modification and experiment. Pooling of experience in the Experimental Aircraft Association has given impetus and direction to the movement. All types and configurations are appearing in heartening variety. Some original designs are giving exceptional performance on low horsepower ratings.

One California experimenter is studying a "condensed" wing. Its span is only 12 feet as compared to the original 36-foot wing and it is mounted parasol fashion atop a two-place Taylorcraft. The chord of the *Larson* wing is approximately three feet.

Short wing span apparently is the trend followed by most experimenters. Take for example Steve Wittman's *Tailwind*. This two-place high-wing monoplane designed by the noted midget racing pilot, has a wing span of but 20 feet, with a wing loading of 15 lb. per sq. ft. Powered with an 85-hp Continental, the ship has a top speed of 175 mph and cruises at 150. Landing speed with flaps is 50 mph, and without flaps the ship touches down at 60 mph. Empty weight is 685 lbs. and gross 1,235. The airplane carries 25 gallons of fuel. During a performance test, Wittman completed a 3,150 mile round trip from Oshkosh, Wis., to Ft. Lauderdale, Fla. The *Tailwind* averaged 154.6 mph, and the C-85 burned 5 gal. per hour —or looking at it another way, 30 miles to a gallon of fuel. Wittman's *Tailwind* is the first home-built airplane in the United States to be certified by CAA under CAR 174-3 to carry non-revenue passengers.

Another 20-foot wing span airplane which has caught the eyes of pilots is Detroiter Neal Loving's WR-1. This single-place ship has inverted gull wings, and its fully-enclosed landing gear is mounted at the point where the wing sections join together to form the gull. This enables one fairing to close in the landing gear and wheel in what amounts to a large wheel pant. The arrangement is as close to a retractable gear as one can get. With such a unique design, the 85-hp Continental pulls the WR-1 through the air at 200 mph max; cruise depends upon the desired power setting and is 155 mph plus. Loving flew his ship from Detroit to Jamaica, B. W. I., in 17 hours and 25 minutes . . . 2,200 miles at 4.49 gal. per hour.

Paul Poberezny, who heads the Experimental Aircraft Association, 3801 S. 56th Street, Milwaukee, Wis., is a veteran of the Korean air war who now flys an F-86 as a Reservist. However, he points out that he receives an unusual feeling of accomplishment in his home-built *Little Audrey*. This hybrid has *Cub* cowling around a

Right: Sporting no wing struts, the *Super Dart*, built by Jack McRae of Hempstead, N. Y., has a 55-hp engine, cruises at 110 mph, stalls at 50.

Left: Paul Poberezny, head of EAA, waves from *Little Audrey*, the hybrid single-seater which has a maximum speed of 150 mph. Powered by a 75-hp engine, it flies on cut-down Luscombe wings.

Below: Inverted gull wings are featured on the WR-1 built by Neal Loving of Detroit. Its 85 hp engine gives it a top speed of 200, stall of 60.

By TED DUROSKO

FOR EVERYBODY

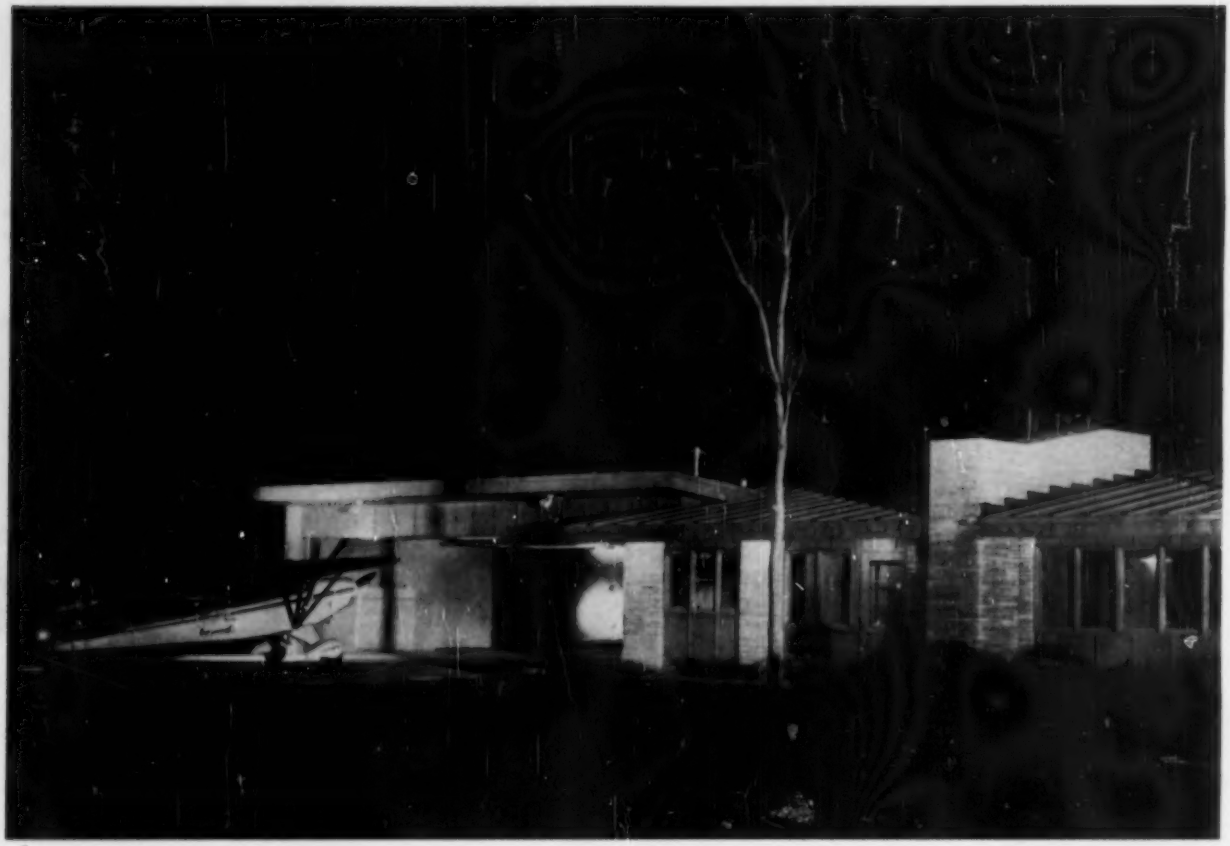
75-hp Continental. It flys on cut-down Luscombe wings and lands on a Cessna-type spring steel landing gear. With a wing span of 18 feet, it has a maximum speed of 150 mph. Cruising speed is 135 mph and it stops flying at 50 mph. Poberezny reports that he can get *Little Audrey* in and out of any *Cub* field with ease.

Typical of the way many enter this field of experimentation is the case of C. S. Lasher of Hialeah, Fla. Last summer he got the urge to rework his Aeronca *Champion* for increased maximum speed. Then too, he wished to eliminate the float during landing. He cut off the inboard bay of each wing. This reduced the wing span from 35 ft. 1¾ in. to 28 ft. 3⅞ in. According to Lasher, the inboard bay is easiest to cut off, yet does not place the plane in the "hot rock" class. An 85-hp Continental was substituted for the original 65-hp engine and this decreased the power loading from 18.8 to 14.4 lbs. per horsepower. Upon installing the C-85 with fuel injection, several minor cowling and baffle problems were encountered but were solved by a little trimming and realignment.

In completing the modification, a ground adjustable prop, shoulder harness, and wheel pants were added. For his efforts Lasher found his *Champ* has a top speed of 120 mph; gets off the ground in 250 feet in still air; in touch-and-go landings is off in three point position as soon as the throttle is opened; (*Continued on page* 56)

Above: A high performance two-place plane with an 85 hp engine, the *Tailwind*, built by Steve Wittman, has a maximum speed of 175 mph and cruise of 150. Note "S"-shaped prop.

Left: Designed for speed with thin wings, the *Slow Poke* was built by Roy True of Monroe, Mich. Wing span is 16 ft. Powered with an 85-hp Continental, it has a maximum speed of 210 mph.



1

HANGAR HOUSE

2

3

Some people dream about a hangar home, others build them. This one has radio-controlled lighting and hangar door.

By RICHARD P. JONES

PRE-TELEVISION HOLLYWOOD'S FORMULA for a successful business was to find a booming popcorn corner and build a movie palace around it. Minnesota's flying Vernon M. Johnsons substituted an airplane hangar for the popcorn machine. Then they tacked on a home. A two-plane family, the Johnsons are now well on their way to building the Twin Cities' first airstrip community, an adventure in suburban living for flying families.

Situated 20 minutes driving distance north of Minneapolis, the Johnsons own 65 acres of building sites adjacent to a small private airstrip. They hope to surround themselves with flying friends and, incidentally, build their homes for them. Some 30-odd lots for flying families can be accommodated, plus another 135 more conventional home sites.

Mr. Johnson's hangar-home is just across the road from "Pierce's Strip," a sunup to sundown landing field operated by George Pierce and his Anoka Flying Service. The 44-foot house is redwood and stone, built on a floating slab. It is placed diagonally on a large lot because of the runway location.

A 36 ft. x 22 ft. heated hangar attached to the home houses Johnson's four-place Piper *Pacer*, with a pickup truck tucked under one wing and the family car under the other. Their back yard provides tie-down space for his wife's two-place Cessna 140.

The hangar has a one-piece, sag-free, overhead door which operates by radio control. Made of 2 x 4 redwood planks tongued and grooved, the door was designed by Merle S. Else, a former AAF fighter pilot who specializes in designing problem doors for the military air services.

According to Else, Johnson's hangar door is the first all-wood door of its size (32 ft. x 9 ft.) to be power-operated and hooked up with a runway system that controls it from the plane. A 1,600 lb. concrete counterweight helps open the door by reducing the strain on the operating mechanism. By pressing a button on the hangar wall or by pushing a knob on the *Pacer's* dashboard, the door opens or closes automatically.

Flying in late at night, Johnson can turn on a 2,000-watt floodlight from the same control. The entire 1,485-foot east-west runway is illuminated, assuring a well-lighted landing. The specially designed radio-control system can be operated from an altitude of 1,000 feet.

Mr. Flying Contractor can, by remote control, turn on the floodlight and raise the hangar door, land, taxi into his back yard, into the hangar, and step from the plane into his kitchen—without putting a foot down outside.

Interior of the home utilizes redwood and stone too. Planned for highly convenient contemporary living, it is of two-bedroom construction with a den-office, living room, dining room, kitchen and bath. Much of the furniture is built-in. Roomy wardrobe closets throughout the house have sliding doors stained to match the redwood.

The airstrip lacks many of the niceties: there is no blacktop, no regular lighting and there's space only for private ships. But there are no tie-down fees, no noise, and costs can be shared in five group hangars with storage space for seven planes. Three runways are in use, with room for a fourth. The field boasts a CAP club with a Piper J-3 *Cub* owned jointly by its members. Three flying instructors are available evenings and week-days.

If you plan to set down there some day, you will find it at latitude 45° 11′ 30″, longitude 93° 22′ 0″, elevation 896 ft., 1.2 miles SE of Anoka, 4 miles SE of Coon Rapids. Drop by and see a novel way of living! END

1
Hangar door and 2,000 watt floodlight are operated by radio from plane.

2
View of living room from hallway shows style of contemporary interior.

3
Fireplace covers entire wall of living room which is 20' 9" x 12' 9".

4
Power for radio controlled door is supplied by a ½-hp electric motor.

5
Wall cabinets of kitchen are wood, range and oven of stainless steel.

I treat 'em rough!

A new concept of engine operation which has a few old-time pilots on the ropes.

By TOM DENNY

THE OUTSIDE AIR TEMPERATURE was a brisk 34° F. when the two of us climbed into my 135 *Tri-Pacer* to fly to Put-in-Bay for some pike fishing. My friend was Tom Powers, who has been flying over 20 years.

I started the fan, released the brakes, and let the *Pacer* roll to the take-off runway. This took about three and one-half minutes. I ran in the throttle until the tach read 1,500 rpm's. Then I took a look at the oil pressure gauge. It read normal, although the oil temperature and the cylinder head temperature pointers were still far below the green. As I fed in the right mag and then the left, I watched the tach and oil pressure simultaneously. Both mags indicated the normal small drop. Each ignition system ran the engine smoothly and oil pressure was steady. Satisfied, I checked the carburetor heat and then advanced the throttle to a higher speed. The engine accelerated smoothly and did not cough or sputter. The oil pressure remained normal and steady.

To make sure, I repeated the run-up to approximately two-thirds throttle. Same smooth performance and steady oil pressure—even though the cylinder head and oil temperatures were still not in the green. I released the brakes and started my take-off.

As the plane began to accelerate, Tom leaned his head toward mine.

"Hey! What are you trying to do, ruin your engine?" he shouted. "Your oil temp and cylinder head heat are still below normal."

"Yep, I know," I answered, "but, according to the 'new school' of thought, the engine was ready for take-off."

"—and," I added to verify my point, "the theory works—we've got 400 feet already and the ole Lycoming is churning up as sweet as ever."

Tom sat back and remained silent until we climbed to 3,500 feet. "What do you mean—that 'new school' of thought?" he then quizzed.

"Well," I commented, "it amounts to the fact that the technical progress in engines, oils, and airframes is getting way ahead of our cockpit procedures."

"I still don't follow you."

It all started, I related to Tom, about two years ago. I attend many air trade meetings and began to hear of this new concept of engine treatment. And more and more I became intrigued with the new concept—however, I still treated the Lycoming in my Piper with the full warm-up treatment. Possibly it was a statement by an aircraft engine manufacturer that really started me seriously to study both sides of the argument. He said, "In my opinon a large percentage of forced landings which occur on take-off or shortly thereafter are caused by excessive ground operation of the engine."

For some months following, I talked with every engine man, designer and pilot I ran across who had an opinion on the subject. After approximately a year of seeking out information, I was converted to the modern technique of engine treatment because of the following reasons:

First, a good many pilots fail to realize that cylinder head and oil temperature gauges lag behind the actual condition, especially during the period immediately after starting the engine. At this time, the instruments are reporting the condition that has *taken place* and not *what is happening*. In some cases this information, as reported by the oil and cylinder temperature gauges, can be too late.

Error also can enter into the cylinder head temperature reading from another angle. Usually the temperature is taken from the cylinder considered to be the hottest. However, any other of the cylinders can run at a higher temperature due to a sticky valve, a sticky ring or cracked porcelain on a spark plug.

Coupled to this is the remarkable progress made in lubricants during the past years. No longer do we use crude grades of oil which required heating to fairly high temperature before reaching an easy-flowing consistency. Recommended practice today in light plane engines is to use a 30 weight oil in summer and a 10 weight in colder weather. Such a light viscosity of oil in winter also will facilitate the starting of a cold engine.

By this point in my narrative, we approached Put-in-Bay and landed on the island. As we climbed out, I saw a Ford *Tri-motor* and a Waco UPF parked on the line. "Let's go over by those airplanes. They illustrate another point," I said. Tom nodded and we walked in front of the Ford.

"I think I know what you are driving at," he commented. "Look at those engines, especially numbers one and three. They are hung out there in space where the cylinders get a good flow of air at all times when the prop is turning."

"Exactly," I agreed. "Designs of older planes allowed for plenty of cooling of the engine. Look at that uncowled engine on that Waco UPF."

For contrast, we then turned to the *Tri-Pacer*. Its appearance emphasized the fact that today's light plane engines are tightly cowled. With such a low-drag cowl design, it is near impossible to get an adequate air flow around the cylinder unless the airplane is airborne. While on the ground, during taxi and run-up, the low volume of air flow allows the cylinder walls to become overheated. The longer the ground running time, the higher the cylinder wall temperature. This (*Continued on page* 63)

Credited with saving many pilot lives and several million dollars worth of jet planes, the "rabbit catcher" is an ingenious combination of nylon webbing, steel cable and heavy chain. When the nose wheel hits the webbing (shown below), the plane drags the chain down the overrun strip, stopping when resistance of the chain overcomes momentum of the plane.

Rabbit Trap

Here is one trap that the "rabbits" are glad to be caught in.

By GLENN INFIELD

A JET PILOT OVER KOREA returning from a combat mission, often had a lot of things on his mind. One such worry was the hot landing ahead if his flaps were shot up or his brake power gone. So the "Willie Westinghouses" came up with an arresting device stretched across the runway. A combination of nylon webbing, steel cable and heavy chain, it aided numerous pilots to bring their crippled planes to a safe stop.

Called "rabbit catcher," the gear was contrived by Air Force and Navy men who pooled their ingenuity and experience. Air Force officers, examining a comprehensive report on jet fighter accidents, were dismayed to note that 27 combat planes had washed out because of aborted take-offs or emergency landings due to battle damage. Five pilots had been lost and several seriously injured. Each plane destroyed had a $300,000 price tag.

Seeking an arresting gear that was transportable for use in the combat theatre, easy to build and operate, and that did not require the services of additional personnel, the researchers were hard put for something practical. Ideas faded as fast as they popped up. They thought of stretching a cable across the runway and installing a hook on the tail of the plane, as is done on carriers. Snubbing by use of compressed air and hydraulics was also considered. But if a device was to help out in Korea—time being of the essence—it would have to be constructed from materials at hand. This requirement proved the key that unlocked the necessary imagination.

Someone recalled seeing at the Osaka steel yards two 800-foot lengths of heavy anchor chain used of yore by Japanese warships. Another remembered the Navy's experiments with chain at Patuxent. The researchers yelled tally ho, and started putting things together. They joined the two sections of chain with a steel cable across the runway. Nylon webbing was attached to the cable with risers. The webbing was stretched taut between a stanchion on each side of the strip to a height of three feet. The risers were connected to the cable which rested on the concrete. The chains were parallel to the runway and headed up-wind on the overrun strip side of the stanchions.

The jet pilot heads the speeding plane towards the center of the barrier. When the nose-wheel hits the nylon webbing, the cable is picked up to a height of about three feet and, as the tension increases, the webbing breaks and the cable springs back to engage the landing gear struts just above the wheels. A shear pin which holds the cable to the stanchion breaks and the plane drags the heavy anchor chain with it as it races down the overrun strip, finally coming to a stop when the resistance of the chain overcomes the momentum of the plane.

During initial trials a few bugs were eliminated. The first test with the chips down came when a hot landing jet overshot the runway and hit the barrier at 120 miles per hour. It was stopped without a jolt. After this successful "catch," an operational installation was set up at a front line fighter strip which had been designated a haven for jets in trouble because of its proximity to the bomb line. In less than two months, 10 planes were stopped by the barrier without losing a pilot. Damage to all but one of the jets was negligible.

Perhaps the luckiest "save" was that of a *Thunderjet* which began its take-off with full tip tanks and two 1,000 pound bombs. The plane lost power, refused to leave the runway, and smacked the barrier (*Continued on page* 64)

Percy

Buzzing a huge grizzly

while ferrying a light plane to Alaska,

these two pilots left a very

Bewildered Bear

By WILLIAM M. JONES, JR.

TO ALEX SOMPPI AND I, there were two things of paramount importance—flying and fishing. So it was only natural that we would jump at the chance to deliver a plane to the village of Yakutat, in southeastern Alaska.

Tales of the huge trout and mammoth bear that abound in this primitive area had reached us before, and now that the opportunity was actually at hand, we were oblivious to the problems of such a flight. Our final preparations and procurement of emergency gear were accompanied daily by a barrage of warnings and admonitions of fellow pilots. It was a common knowledge that the flight in a light plane such as the Cub *Cruiser*, was considered extremely hazardous and frowned upon by the CAA and Air-Sea Rescue Authorities.

Our day of departure had been typically SNAFU, with rain squalls following close on the heels of one another, but breaking at noon to allow our take-off for the northern tip of Vancouver Island, British Columbia. With sharp head winds prevailing, our first over-water flight seemed interminable.

Sitting in the cockpit bulging with sleeping bags and gear, we discussed the second leg from Vancouver Island to Annette Island, Alaska—fervently praying that tail winds would favor us. This was to be an over water flight of 450 miles, and no emergency fields en route!

It had already set in on us—that peculiar itchiness which affects so many pilots. We were comfortably relaxed when flying over land, regardless of the mountains below, but immediately upon leaving the shoreline, a stiffer attitude was assumed; and the engine invariably went into "Automatic Rough." The carburetor heat was tried at frequent intervals and instruments were watched with eagle eye. This apprehension was to remain for the duration of the flight whenever our course took us over any expanse of sea.

It was at such a time—having been under way for two hours, that Al decided to have some fun at the expense of gray hairs for me. Slowly, unnoticed, he inched the carburetor heat to full on and suddenly pulled the throttle closed. There was a frantic second or two of clawing for the controls that would inflate my Mae West, before I noticed Al rocking with laughter. That rascal doesn't know how close he came to being strangled for a stunt like that.

The otherwise tranquil flight to Annette was marred only by one sudden storm which lashed the *Cruiser* with spine-jarring gusts but ten minutes after landing, Annette was socked in "zero—zero," and remained stinko for three days.

Departing immediately after the storm passed, we proceeded on our final jump to (*Continued on page* 65)

An emergency landing would be out of the question in this rough terrain along the Grenville Channel.

WITHIN 180 DAYS, I FLEW some 150 missions in support of French resistance against the Communist aggression in Indo-China. Forty-one of those missions were air drops to Dien Bien Phu, the last of them on the day before the Reds finally overran the remnant of defenders.

In that whole sorry story, one thing stood out clearly . . . the gallantry of the Foreign Legion. Tight as I keep my hat on my head when some other angles are mentioned, I take it off to the Legion. They went under but they need never be ashamed of their part in Indo-China.

Originally I volunteered for flying in Indo-China because it seemed to offer several attractions. Skeptics will suspect that the good pay was the uppermost consideration. Sure that counted, but it was not the biggest reason. Bigger than that was the chance to gain experience in a part of the world I did not know, and perhaps bigger still, the chance to work for Gen. Claire Chennault, whose CAT airline had the contract to supply air drop for France. My long admiration of Chennault and CAT was confirmed at every turn during my flying for them. They are tops and there is no exception to that.

Since return from Indo-China, I've been written up and introduced almost without exception as a "soldier of fortune." That is far off the beam. As I figure it, this is the air age and I'm a young fellow. This is my time to accumulate breadth and variety of experience so that I

I FLEW AT DIEN BIEN PHU

Air power in Indo-China was air drop, with monsoon weather, jungle terrain, radar directed ack-ack and guerilla attacks on air bases.

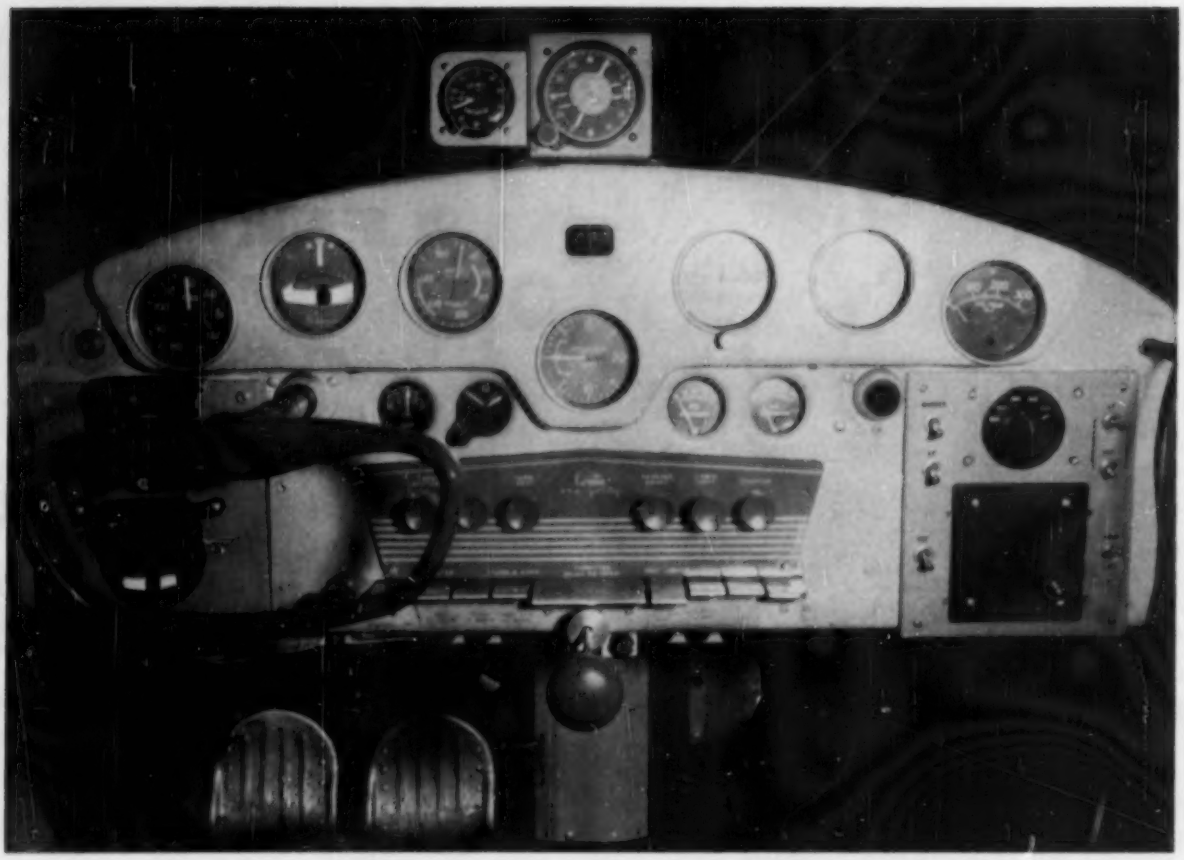
By ERNIE CEDERGREN, JR.

can total it up and really have something to offer when the chance for bigger things presents itself. Maybe this is a good idea and maybe it isn't, but at least it's mine.

Air power in the Indo-China war was preponderantly a logistic operation. The French had some fighter and light bomber activity, and originally they also flew the air drop. However, jungle country is usually scarce of targets; and enthusiasm for the tactical use of air power never got whipped up. I used to wonder if it couldn't clear out some of the anti-aircraft fire in the areas where I had to drop at tree-top altitude, but maybe it would just have stirred up the hornets more. I don't know. In any case we didn't have to worry about air traffic on our drop patterns and although the ack-ack was radar directed and equipped with proximity fuses and always spattered us, I took only seven direct hits. One of them was lucky, as the shell came up through the cockpit of the C-119, went on up through the roof and didn't explode till it was 50 or so feet above.

The Viet Minh ack-ack, Soviet directed of course, was arranged in three circles around the big drop targets such as Dien. There was no use trying to get past them by flying in the overcast since the guns were radar directed. Furthermore our drop zones were never very big and grew decreasingly less as the Commies closed in. They were sure to get good shooting and did, but the C-119 is a hog for punishment and very few of us got knocked down on the spot. Some times the plane couldn't be flown again without major repair but it was remarkable how few kills the anti-aircraft made in proportion to the battle damage.

The usual drop load was from six to seven tons per plane. If the stuff wasn't too perishable or breakable we usually shoved out the chutes at around 1,500 feet. In cases where impact with the ground did not matter too much or where the drop zone was only a hundred or so feet wide, we got right down on the carpet . . . 50 feet maybe. The biggest thing I (*Continued on page 66*)



Instrument panel of the author's Cessna 140, one of the most completely equipped light planes flying.

LIGHT PLANE UTILITY

IT WASN'T UNTIL recently that the utility of my light plane became a reality through new combinations of navigation equipment.

Airframes have long been well designed but careful selection of navigation equipment has too long been neglected.

Possibly aircraft owners haven't wanted to pay the price thinking it unnecessary. Possibly airplane manufacturers haven't included it because they thought extra price would lose sales.

Instead of losing sales, I fear this type of thinking has damaged public regard for light planes as good transportation. The utility of an airplane to save time with safety and comfort, is the main reason most of us fly.

During 14 years in light planes, I have been searching out the important limitations. At the moment, the most important gap is the need for more navigation equipment in our planes and for more training on how to use it. CAA has done much of late years to improve radio communications and navigation facilities throughout the country. High frequency omni and VHF communications, reducing rain and snow static, and making possible the determination of azimuth position from the station at any time, are big steps forward. Availability of ILS localizer and marker beacons is a shot in the arm for light plane travel. This new type of navigation, compared to reading railroad signs and groping over smoky cities, is the difference in whether an owner will use his plane or sell it.

The old railroad track method of navigation is all right to fall back on once in a while, but I'll never forget the time I nearly flew into the hill above the Hoosac Railroad Tunnel near North Adams, Mass., and just saw it in time. In the smooth air that day, it would have been much safer to have turned on the Boston-Albany Omni and to have filed an IFR flight plan over the hump into Boston. In those days Omni and VHF weren't available and Low Frequency Radio wasn't good enough to rely on, either for much distance, or in a rain shower. The best navigation method was dead reckoning, DR, with an E-6B or other good computer between contact fixes.

So much for the past navigation techniques, let us investigate additional equipment available for light planes today.

Several of the new airplane models on the market have improved the navigation situation. However, I wish to point out some particular navigation equipment which

Here's a man who flies his light plane in almost all kinds of weather—safely!

By E. F. FLINT
Sales Engineer, Eastman Kodak Company

The author with his specially-equipped Cessna 140. Below: ARC-5 LF radio with loop power plant (foreground), DARE Omni converter (center) and power pack for the VHF Beacon Receiver, shock mounted on special rack assembly located on floor of baggage compartment.

has increased the utility and safety of my airplane. A knowledge of the details may be helpful to other owners, and to the aircraft industry. My equipment needs have been recognized and sometimes forced upon me at one time or another during past flights over most of the United States. After considerable reviewing and analyzing the requirements and costs, the following equipment was decided upon as essential to my Cessna 140: (Items marked with asterisks came with the original airplane.)

Loop Antenna
LF Antenna
VHF Whip Antenna
VHF Marker Antenna
Omni Antenna
*Radio Shielding—Engine
*Loud Speaker
Right and Left Front Panels
Shock Mounted Rack Assembly
LF Receiver ARC-5, R-23A

LF Dynamotor DY-2
VHF Beacon Receiver #1023
LF Remote Control Box
VHF 10-Channel Transmitter
VHF Receiver 108-128MC
Omni—ILS Localizer Indicator
Omni Converter
VHF Power Supply and Dynamotor
*Phones and Microphone
Direction Gyro—AN5735-1
Navigator—Grimes
Pitot Tube
Remote Indicating Compass—AN 5730 and Dynamotor
*Sensitive Altimeter
*Turn and Bank—Electric
*Rate of Climb Indicator
*Clock with Sweep Second
Outside Air Temperature
*Left Landing Light
Navigation Light Flasher
Stall Indicator
Cylinder Head Temperature Gage
Manifold Pressure Gage

The total list price of these 33 items, weighing about 70 lbs., comes to around $3,100. The present value, considering that some of the equipment can be purchased from surplus, is approximately $2,000. These prices do not reflect instrument and radio installation costs.

The arrangement of the instruments is particularly adapted to the Cessna 140, although it could be used in the same manner for any cross-country airplane. I would prefer to have the airspeed, bank and turn, and rate-of-climb indicator installed left to right on the upper left panel. The sensitive altimeter should take one shift to the left and the manifold pressure gage should go in its place next to the engine rpm indicator in order to have all the final approach instruments on the left side.

There are some good reasons for the equipment duplication listed. Sometimes we have to learn the hard way, as in the case of gyro failure. It happened one time coming back to Rochester from Boston-Bedford Airport. I was boring my way up through a solid overcast on an IFR flight plan between Boston and Syracuse when suddenly the remote compass started to swing in an unusual manner during supposedly straight flight. Applying a little rudder, the rate gyro needle on the bank-and-turn indicator wouldn't move. By pounding on the panel, it started and stopped several times, however, I was able to continue the climb through the overcast to 8,000 feet and proceed to Syracuse according to flight plan. The conical copper rotor contact had worn flat and stuck to the flat electrical contact. Had I had both the direction gyro and bank and turn indicator on this flight, it would have been considerably more comfortable.

Another duplication is the use of two radio receivers separately connected to the battery. This gives one more receiving channel and the output is connected to either the loud speaker or phones, as the need may be. After having trouble with the vibrator type radio power supplies, the power supplies for high voltage are all the dynamotor type .

The compass duplication noted on the panel photograph may not seem important at first. However, for IFR approaches, I like the complete 360° dial in the remote compass for orientation, with the mechanical setting dial placed on the final approach. The (*Continued on page 67*)

Special procedures to be

followed by aircraft during a military emergency

are governed by the system known as

SCATER

By ARTHUR GORDON

WEATHER OVER EASTERN U.S. and Canada one day was varied from below instrument approach minimums to a little better than VFR minimums.

Suddenly, in a remote outpost above Hudson Bay, a group of men bent anxiously over a radar scope. Thirty seconds later, a signal winked a thousand miles south. In a big underground room somewhere on the Atlantic seaboard, that signal sparked a fire of tension and activity. Minutes of hurried checking and cross-checking followed. A decision was made.

To hundreds of government and public agencies along the New England coast, a message flashed. In airways stations, centers and towers, routine transmissions were interrupted. All facilities twice snapped out a short and emphatic broadcast. Operational transmissions were then resumed at an accelerated pace.

Aircraft on instruments over or approaching all metropolitan centers either continued landing, if close in, or reversed course from the affected area. In local areas, VFR traffic responded to both radio and visual recall.

Shortly thereafter (only for such a time as absolutely necessary in the interests of public safety) all broadcast in the affected area ceased and radio navigational facilities left the air.

Meanwhile, from a dozen scattered Air Force bases, long-range jets took over the airspace just vacated, while short-range interceptors responded to alert procedures. Within a few minutes, the entire sky over the threatened seaboard had been cleared of civil aircraft and given over to the military mission.

Such is the modus operandi of SCATER, the civil and military joint plan for Security Control of Air Traffic and Electromagnetic Radiations. Many details must remain secret but the double-barreled job is to safely clear the air of civil and non-tactical military planes and reduce all communications to minimum. Speed and discipline are vital.

Hence the well-known flight restrictions in the designated ADIZ zones, especially across or near our borders. Within the three million square miles of the U.S., there are innumerable areas which must be afforded protection from air attack. The SCATER plan considers not only potential civil targets and the many routes thereto, but also preservation of our ability to strike back, the greatest deterrent against an enemy attack.

Similarly, it would be folly to "assume" the intended target and not clear the air for defensive action over an area wide enough to insure meeting any possible sudden diversion, either to an alternate target or as the result of a deliberate enemy feint to cover up the real target.

It is conceded that Russia has the strategic air strength to deal us a serious blow, except for certain factors. One is our ability to launch a devastating counter-attack. Another is our growing ability to impose an unacceptable rate of loss—called attrition rate—on such an attack. It has been estimated that 70 per cent of an attacking force would be able to penetrate our air defense system! With every passing day, our experts are working to whittle down that figure.

It doesn't take much figuring to realize that in a threatened area the presence of civil aircraft at a critical time imposes an unacceptable burden on our defense system, which must be able to detect an intruder, confirm his hostile intention, and intercept him in time.

The three conditions of air defense warning are briefly:

WARNING WHITE

Attack by enemy aircraft possible, although not at the moment probable. (This condition will exist upon declaration of a "military emergency" and additional restrictions will be effected within air defense identification zones.) It also may mean ALL-CLEAR after a potential or actual attack.

WARNING YELLOW

Attack by enemy aircraft probable.

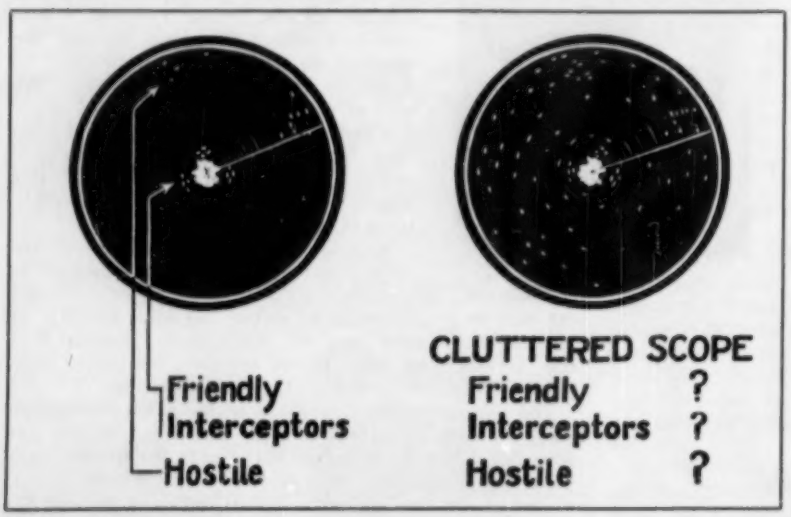
WARNING RED

Attack by enemy aircraft is *imminent*. (Interception of all but friendly defensive airborne targets and their destruction may be necessary.)

In sensitive areas any suspicious flight pattern or action of *oncoming identified* as well as unidentified aircraft could result in a situation of "Air Defense Readiness," in which interceptor aircraft and facilities would "clarify" the situation. The military will not permit a "Pearl Harbor" incident within the continental limits of the U.S.!

In simple terms of life and death mathematics, the *time* required for *detection*, (*Continued on page* 56)

Radar showing difficulties imposed by presence of civil aircraft during emergency.



THE PRO'S NEST

Cross-wind Landings

The wind won't always be "down the groove" on the one-and-only strip.

By JOHN R. HOYT

AS YOU FLY OVER THE STRIP to check the wind, you notice that the sock is not lined up with the one-and-only runway. You take a closer look to get an idea of how strong the wind, how gusty, and from exactly what direction it is blowing. The sock is partially limp, indicating about 10 knots, it flaps a bit (indicating gusts), and it is pointing about 20 degrees off the runway.

With this knowledge, you should know what, and what not, to do. You have heard about the novice who permits the wind to drift him across the runway at the moment of touchdown: he either ground loops immediately or, during the roll-off, mistakenly thinks the plane is completely landed and lets it get away from him.

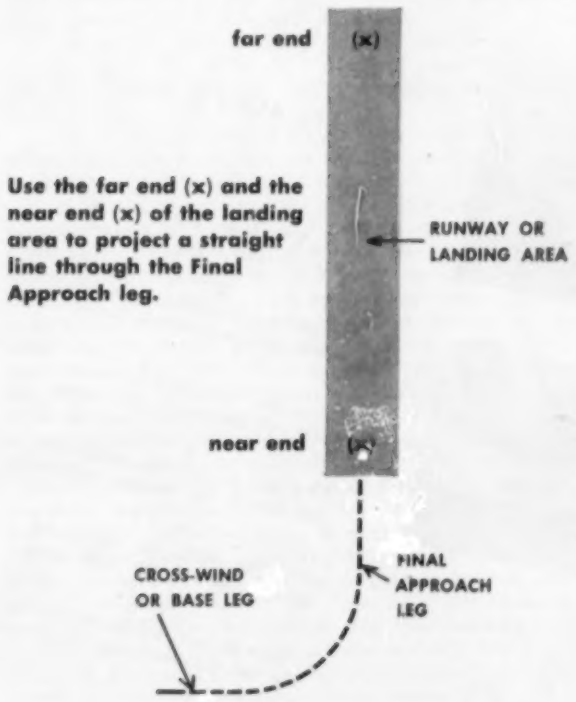
This situation need not exist. Cross-wind landing technique *can* be learned, and, what is more, *should* be learned. You can just bet the wind won't always be "down the groove" when you land on those small, one-way fields!

There are only two accepted techniques of landing cross-wind, and they may be combined into a third way. But you say, "I don't care about three methods; I want to know one *good* way. And besides, how do I know how much cross-wind I have?"

First of all, one should know both methods because no situation is exactly like the one before it, and a good pilot combines his methods. Second, we don't have to know the exact wind velocity because a 12-knot cross-wind won't require much different technique from that used in a 15-knot cross-wind. What we do wish to know is the approximate velocity, the direction of the wind, and the gusts, all of which can be obtained from the wind sock.

With this knowledge we get lined up on final approach for the runway. Our sole objective, regardless of wind velocity or direction, is to keep the path of the plane over the ground the same as the final approach leg during the approach and the landing.

This being the case, let's learn an Easy Rule which will help us with any method of landing cross-wind. Here it is: MAKE YOUR TRACK COINCIDE WITH THE FINAL APPROACH LEG. In other words, fly directly above an imaginary down-wind extension of the runway. The illustration shows the desired track.

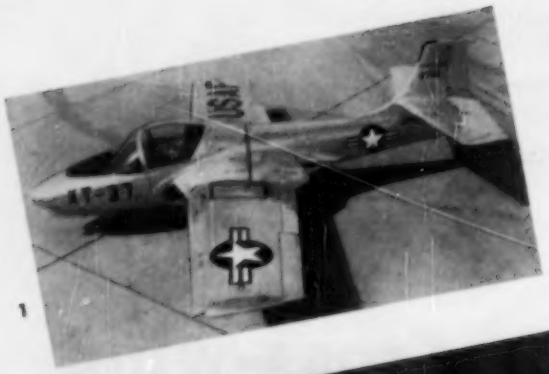

far end
(x)
Use the far end (x) and the near end (x) of the landing area to project a straight line through the Final Approach leg.
RUNWAY OR LANDING AREA
near end
(x)
CROSS-WIND OR BASE LEG
FINAL APPROACH LEG

METHOD ONE. This has been called the easiest method. Reduce your airspeed to the maneuvering speed, a power glide about 60 per cent faster than the stalling speed, and after turning on Final Approach get lined up with the runway or landing area. Do this by glancing first at the far end of the runway, then the near end, and project the runway toward you as in the illustration.

On this heading note your drift: let us suppose the wind is from the left and you are drifting to the right. Make a turn back to the imaginary runway, which we will term for convenience the "runway-line." Straighten out on the runway-line heading, then lower the left wing into the wind and apply enough right rudder to keep the plane from turning to the left. The exact amount of downward left-wing depends upon the wind velocity, wind direction, and airspeed. (With excessively high winds Method Two must be used or combined, as described below.)

Now, using enough downward left-wing to keep the plane on the runway line, remember that the wind usually varies somewhat in direction and velocity during the descent. This means that a constant revision of the situation is necessary, a constant varying of the downward left-wing and right rudder in order to make good your desired track.

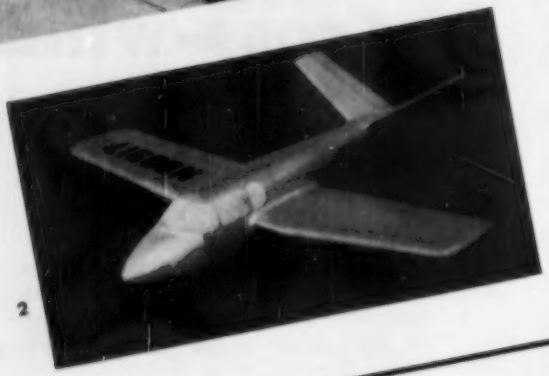
When you cross the "fence," use your information relative to the gusts. With strong gusts, do not change to "over-the-fence" speed, but maintain your maneuvering speed. If the field is short and you decide to slow down to "over-the-fence" speed, you must weigh the hazard of dropping out (due to a sudden un-gustiness). However, remember that the landing speed is decreased by cross-winds up to 45 degrees, and (*Continued on page* 54)



1

The little jets now in design and test stage may be forerunners of a new era in private flying.

Want to buy a JET ?



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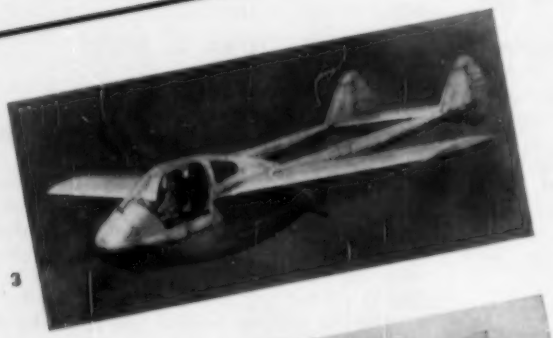

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4

5

By ALICE S. FUCHS

1
Cessna's XT-37 is the first American light jet to reach flight test stage.

2
A single jet, side-by-side two-seater, the *Wee-Jet* is being built in Tucson.

3
France's tiny SIPA 200 *Minijet* cruises at 225 mph but is smaller than a Cub.

4
SIPA 300 trainer, big brother of the *Minijet*, has tandem seating.

5
Two *Palas* turbo-jets give British Miles *Sparrowjet* 250 mph speed.

6
French Morane Saulnier 760 *Paris* is the first four-place light jet plane.

Editor's Note: *The reader may or may not believe that the day of the personal jet lightplane is just around the corner. However, he will be interested to know that, while this article was being prepared for press, we received our first serious request for information on where to buy a jet. Furthermore, nothing less than four-place would do; price was of no major concern; and motivation . . . just sheer love of speed.*

MORE AND MORE at military air bases, the whistle of the jet is drowning out the sound of the piston engine. In civil transport, the turbo-prop and the pure jet are attracting avid attention. In Training Command, the light jet is usurping a routine role.

Is there a chance that the standard personally-owned aircraft of today will be pushed off grass roots airports by sleek little jets designed for the private pilot? Can a jet be made small enough, easy enough to fly, and above all, cheap enough, for the individual?

Probably not next year; but it is far from an impossibility. The little jets are coming to personal flying just as surely as the big ones have taken precedence in the military field.

Small jet planes which I recently investigated in different countries show that the jet lightplane already is far beyond the drawing board stage.

First of the group was the *Sparrowjet* built by the progressive Miles Aircraft Ltd., of England. A 65-mile drive from London brought me to Shoreham-by-Sea, where the Miles factory has been producing aircraft since 1928. The single-seater, twin-engine *Sparrowjet* proved to be a true lightplane. Powered by two Turbomeca engines with 330 pound thrust, the plane is a revelation of what can be done with jets in the light field. The craft is entirely of wooden construction with a plexiglas bubble-type canopy that allows perfect 360° visibility. Location of the engines in the wing roots rather than on pods makes an exceptionally clean design.

The *Sparrowjet* has an interesting history. It was not originally designed as a jet but is a conversion of the *Sparrowhawk*, a racing plane equipped with a 140-hp *Gypsy Major* 4-cylinder engine. Designed by Mrs. F. G. Miles, wife of the founder of the company, the ship was devised and constructed in eight weeks for her husband to fly in the 1935 King's Cup Race. The *Sparrowhawk* was raced with considerable success and eventually was purchased by the well-known English racing pilot Fred Dunkerley. In 1953 the piston engine was removed from the nose and two Turbomeca *Palas* turbo-jets installed in the wing roots. The conversion boosted the speed to 250 mph. The plane has a span of 31 ft. 11 in. and a length of 27 ft. 7 in., with a maximum gross weight of 2,400 pounds.

To date the *Sparrowjet* is far from a production airplane. Intended for racing and research flying, the plane is a valuable contribution to aircraft design since it has demonstrated that the turbo-jet can be successfully used in light aircraft. Chief obstacle in the way of mass production of similar aircraft is the expense. Cost of a single Turbomeca *Palas* engine of this type is in excess of $10,000. The plane has no inherently tricky characteristics, nor is it difficult to fly. It lands at approximately 60 mph and can be flown successfully on one engine.

The Miles Company is at present working on a metal jet trainer now in the mock-up stage—a two-seater which could easily be adapted for a four-seater.

Across the channel at Villacoublay, near Paris, is the home of the SIPA Company, producers of two jet powered lightplanes, the famed SIPA 200 *Minijet*, and the SIPA 300, its bigger brother.

Using the same Turbomeca 330 pound thrust engine as the *Sparrowjet*, the *Minijet* is a single engine, two place, side-by-side aeronautical gem. It is an all-metal mid-wing monoplane with retractable gear, and weighs 1,675 pounds gross . . . well within the lightplane class. The 23 ft. span and 17 ft. length are smaller of course than the *Cub*, *Aeronca* or Mooney *Mite*. The test pilot assured me the *Minijet* was easier to fly than a conventional plane, although it lands at 75 mph and has a normal cruise speed of 225 mph. He does not think the plane would be difficult enough to serve as a jet transition trainer in the military field. M. Jean Cousin, president of SIPA, estimates the *Minijet* could be sold for around $23,000, based on production of a hundred units.

The SIPA 300, which made its first flight only last October, is powered by a Turbomeca of 353 pounds thrust, has tandem rather than side-by-side seat arrangement, and varies in gross weight according to the version used, trainer or liaison, from 1,800 to 2,100 pounds. In this lightplane, the Societe Industrielle Pour L'Aeronautique (SIPA), has pointed definitely at military training and liaison work, but the ship is a lightplane none the less and might well serve private utility if reasonably priced. It has all the happy flight characteristics of the *Minijet* which, after 250 hours of flight testing by numerous pilots, has gained a hearty O.K.

In performance, the SIPA 300 (*Continued on page 70*)

"... or the boss lurks about, desperately urging you into the air ..."

WHY I QUIT INSTRUCTING

Some reasons why good, experienced Flight Instructors are scarce.

By WILLIAM FINN

THE OTHER DAY, one of my fellow civil engineers asked me how much I used to make as a flight instructor. "Three bucks an hour," I told him.

"Good gosh," he said. "That's more than you make here. Sounds like easy money to me. How come you quit?"

As far as the "easy money" part was concerned, I think he was right. Comparing flight instructing hour for hour with engineering—or selling shoes, or driving a bread truck—it's a whale of a lot more fun. I'd rather take a student on a dual cross-country to Elmira than figure out how much storm water will flow out of East Baltimore. And I know a couple of guys who'd like to be sitting in the sun watching their students solo, but they're wearing paths behind the basement hardware counter at Sears.

I'm sure Uncle Sam would like to see me earning a living in the air because it cost the VA more than two thousand bucks to teach me how. And at the time, the only future I had in mind dealt exclusively with *Cubs*, carburetors and cross-countries. I soloed in February, 1946, and was assigned my first student in April, 1947. Three dollars per hour looked to me like a winning ticket on the daily double.

The first year, I was one of six instructors at a Pennsylvania municipal airport which had a roster of 75 private and commercial students. That figured down to about 12 students apiece. Sounds good enough, but unfortunately, when the VA approved the private course by itself, they opened the doors to a certain group of lads who cared not for schedules, deadlines, or a license, for that matter. What they did want was the right to tell their friends they were taking flight training, and as many free sight-seeing hours as the government was willing to buy for them. This was the government's error. The private course, as such, should never have been approved. The G.I. program was established to enable a vet to learn a profitable profession or trade; private pilots are prohibited by law from accepting pay. It was that simple.

"... guys who'd like to be sitting in the sun watching their students solo, but they're wearing paths behind the basement hardware counter at Sears."

The flight school at which I taught was no flash in the pan. It had been in operation since the twenties, and early in the program our manager recognized the pitfalls of G.I. spree flying. Consequently, we forbade passenger carrying on commercial training flights; forbade casual solos out of our four practice areas; in short, flying for fun on the G.I. Bill was out. We did this at our own expense because our 12 students apiece dwindled, and our paychecks

shrank accordingly. I still thought I was going to get rich on that magic $3 per hour. When winter rolled around, I found that sitting in the airport office watching the snow fly, although it's snug sitting, pulls down $0. Weather starves you when you're on straight commission. We got an extra buck for solos and, one summer week I rang up a neat $119. The next six days it rained and blew; the weather broke on Saturday for 15 minutes, and I made a quick 75 cents. I still have that check as a souvenir. At the end of that first year, I had averaged $55 per week. There's the main reason I quit.

By the way, that $3 per hour figure seems to have been instituted way back before most instructors can remember, and it still holds today. I began at $3 in 1947 and was still getting $3, part-time instructing in 1952.

In 1950, I got a job in civil engineering, having had no training in that field whatsoever, except a high school drafting course. I began at $1.10 per hour and flew on weekends to supplement my $44 per week pay. By the end of 1951, I had climbed to $1.55 per hour. Today, having undertaken no extra-curricular engineering education, I stand at $2.31 per hour. $2.31 every hour on the hour boils down to 43 per cent more money for some 30 per cent fewer work hours. Then there's time-and-a-half for overtime, paid vacation and sick leave, and group hospitalization. The only trouble is I'd rather be flying.

The G.I. flight program has petered out at my former place of employment, but now some two dozen pay-as-you-go students are buying flight courses. One of my old students is chief and only instructor, and even with a big roster of students all his own, he's not going to retire on his winnings for a long time. Weather, plus the inability of businessmen pilots to fly during the normal work day, knocks a hole in what could be a fat paycheck.

In 1949, I accepted a job in Northern Illinois as manager-instructor at a small rural airport. I wanted to determine whether a straight salary might be more effective in the long run than the fluctuating pay check of the per-hour instructor. My $60 per week check was higher than the $55 I'd averaged my first year, but when I'd accepted the job, I neglected to see that I had regular days off. As a result, I ended up with a seven day week, and my per-hour pay sank to a new low. And my incentive to instruct was deadened by the fact that I knew I'd get the same check no matter how much I flew.

I'll admit that, for sheer incentive, you can't beat straight commission. I've known instructors to drive their students from and back to the nearest bus stop, five miles distant, to put in a half hour dual. But the fact remains that you can prostrate yourself running up the flight hours in the first half of the week, then weather neatly chops you down to laborer's pay—and a laborer doesn't have to pass seven written tests and three flight tests to solo a wheelbarrow.

"The next six days it rained . . . the weather broke on Saturday for 15 minutes and I made a quick 75 cents."

Most operators recognize the inadequacies of instructors' compensation and some of them have attempted to do something about it. Of course, they're up against it, too, because weather and students' failure to appear knocks them as flat as it knocks instructors. To compensate for loss of flight time, there is the guarantee system which assures the instructor of from $25 to, say, $50 regardless of how much time he puts in per pay period. Not an *extra* $50, but *at least* $50. The policy isn't always successful. Either it happens that you fly enough hours to push you past the low minimum guarantee, or the boss lurks about, desperately urging you into the air so that your commissions will darn sure reach that figure.

So why are there any instructors at all? I'd say that flight instructing is fine for a man who has no pressing need for money. I'd say that a great many instructors are boys who recently earned their ratings and are after that first thousand hours, regardless of the pay rate. I'd say there are instructors who just can't conceive of doing anything else, regardless of their finances.

But how many experienced instructors does civil aviation lose every year? A flight instructor is green for a respectable number of hours after he's rated. Experience is the real quality for which a student hopes in his teacher. Each winter, another crop of instructors takes this hard-won experience to the department store and construction company where it does nobody any good. How many flight instructors can this country safely throw down the drain?

". . . a laborer doesn't have to pass seven written tests and three flight tests to solo a wheelbarrow."

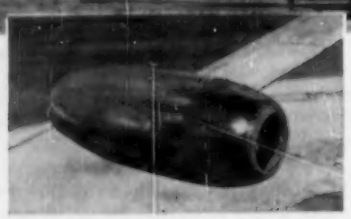
One partial subsidy for instructors would be their inclusion on the selling end of the business, yielding them a percentage of the sales of aircraft, parts and equipment. Another solid boost might be a reasonable straight salary *in addition* to flight commissions. For this, the instructor would assist management with administrative work; perhaps help in the shop on poor flying days. Thus, he would turn his useless stand-down hours into revenue hours.

To meet present flight instructor requirements, you must not only pass the CAA exams. You should be single, living with relatives and content to get along; not ahead.

Not long ago, I rented a *Cub* at the local airport and as I named my ratings for the (*Continued on page* 50)

Have you seen?

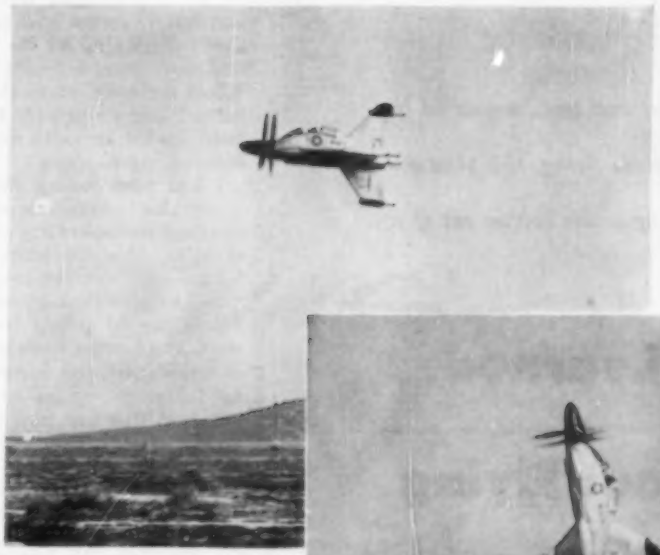
RILEY '55 Right: A more powerful and versatile version of the Riley twin-engine conversion of the *Navion* recently introduced in Dallas, Tex., by Temco Aircraft Corp. Major improvements over earlier versions of the twin include new 170 Lycoming 0340 engines providing top speed of 180 and gross weight of 3600 lbs., improved fuel system which stretches range to 1200 miles, new front seats for increased comfort, redesigned control quadrant and attractive standardized paint design. Conversion is $29,500.



RAM-JET Left: First approved power plant designed for tip mounting on helicopter rotor blades is the Hiller 8RJ2B ram-jet engine built by Hiller Helicopters, Palo Alto, Calif. It is the first ram-jet engine to receive a type certificate from CAA. Resembling a medium size watermelon (inset) weighing 12.7 lbs., the Hiller ram-jet develops 45 hp. No moving parts whatsoever are used in the engine. First installation of the 8RJ2B will be on Army H-32 *Hornet* and Navy HOE-1 helicopters.

MONOCOUPE METEOR Right: New four-place, all-metal plane built by Monocoupe Aircraft of Florida, Inc., features wing tip tanks for all gas, two 150 hp Lycoming engines, full-feathering Hartzell props, instruments and radio. The *Meteor* is undergoing evaluation and certification tests and lists at $25,000 FAF.

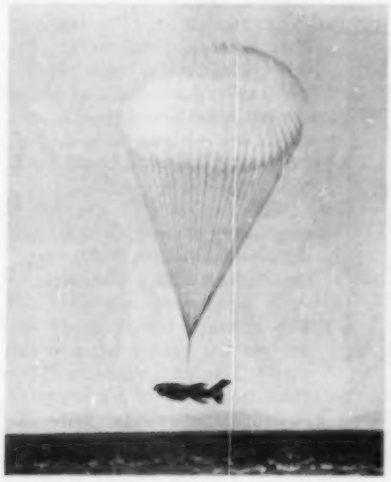
GLASS PLANE Left: Fiberglas reinforced plastic forms covering of Taylorcraft's 4-place model. Advantages claimed are great strength, light weight, resistance to corrosion, reduced maintenance costs. Seats, doors, tanks, pants, cowl and panel are also of the plastic material which will not dent, tear or warp and withstands great impact.



UP AND OVER Right: First VTO to make transition from vertical takeoff to normal horizontal flight is Convair's delta-winged XFY-1. Flown by J. F. "Skeets" Coleman, the ship climbs slowly from vertical position, tilting easily into horizontal as it climbs, reaching normal flight attitude at about 150 feet. First horizontal flights have been held down to speeds around 250 mph. Normal cruise for the XFY-1 is expected to be better than 500. Return to vertical from horizontal is more astounding to witness than the takeoff. Slowing down in nose-high attitude until vertical position and hovering speed are reached, it is then maneuvered to desired landing spot and, hanging on the powerful props, is lowered gently to the ground.

TELL-TALE TAIL Above: Latest in a long line of multi-mission *Neptunes* built by Lockheed for the Navy, the new P2V-7 boasts outthrust "stinger" tail containing secret apparatus known as "MAD-bird"—magnetic airborne detector—for sighting subs under water.

SIKUMBANG Above: The first Indonesian-built aircraft, the Nurtanio NU-200 *Sikumbang* (Bee) recently completed by the Aerotechnical Branch of the Indonesian Air Force. The low-wing, wood and metal monoplane, powered by a 200 hp in-line, inverted DH Gypsy engine with a fixed pitch wood prop, cruises at 140, lands at 55 and has a range of 600 miles. It will be used for light ground support.



CHUTING FIREBEE Left: Amazing longevity of the Ryan *Firebee* is achieved by means of a parachute recovery system which decelerates target from speeds up to 600 mph and lowers it safely to the ground. Since most Navy KDA-1 *Firebee* flights are over water, special flotation features are also incorporated to insure recovery of the targets after they have been parachuted into the sea.

Overloaded and uninformed on the tricks of mountain flying, this pilot made a lucky landing when he ran out of lift.

I Learned About Flying From That!

By A. P. BROOKS

IN LIGHT PLANE FLYING the pilot is dealing with a limited performance aircraft; therefore, altitude performance is expectedly poor. When flying a light plane in the mountains, the loading of the aircraft, time of day and local weather conditions are all important. Being a sea level pilot, those are the items I overlooked one summer day in Texas.

While in college near Washington, D. C., I decided to fly home to Los Angeles for vacation. I owned a 1938 40-hp Taylorcraft, a lot of optimism, and less than 100 hours of flight time around tidewater, although a good bit of my time in the T-craft was cross-country.

In preparation for the trip I availed myself of the AOPA map service and planned a route that would take me to the west coast over the lowest feasible terrain I could find. The highest spot on the route was Guadalupe Pass (approximately 5,200 ft. above sea level) about 100 miles east of El Paso. In planning the flight, I noticed that the stretch over Guadalupe Pass would also be my longest jump—from Wink to El Paso—almost the maximum range of my plane.

I took off and headed west. The first part of the trip was a joy, partly because of the help tower personnel and fixed-base operators gave as I went along. After several days I found myself at Wink Airport ready for the jump to El Paso.

Wreckage of the author's 1938 Taylorcraft, half a mile east of Guadalupe Pass in Texas. It was a long and thirsty walk back.

At Wink I gleaned information about local conditions and some tips on how to fly the pass. Unfortunately, I didn't check into all the ramifications of mountain flying that these local veterans, no doubt, could have given me. About three o'clock in the afternoon I decided that I had waited long enough for the air to cool from the mid-day heat, loaded an extra five gallon can of gas aboard, and secured my luggage.

I had been noting that the further west I went the higher the terrain elevation; and therefore, the poorer the performance of my aircraft—longer takeoff run, poorer climb characteristics. Wink was no exception. My takeoff run was the longest so far experienced and the climb so poor that, at 500 feet above the deck, I decided I had played games long enough and stuck the nose west. The further from Wink I went, the worse it became. It was harder and harder to maintain altitude, and only by flying the ridges was I able to keep ahead of the game. About this time I passed a CAA emergency field and a pipe line pumping station. Since the line ran through the pass, I elected to follow it.

The flying became steadily worse. Soon I was running at full throttle and unable to gain any altitude at all, yet the terrain continued to rise beneath me. I made an error in judgment and lost my position on the ridge I was flying. With less than 50 feet of air between my wheels and the deck, I decided to turn around and return to the CAA strip. Too late, I realized the time for a 180 had passed me by; I couldn't turn because of the draw I was in. It was too narrow and I was flying below the tops of the ridges on either side!

Then, to add to my troubles, the draw narrowed still more and I could see the end of it just ahead. Realizing that I would never make it over the rise ahead, I turned and stalled into the slope on my right.

Luck stuck by me that time; no fire and I was unhurt. The plane was not too badly damaged: prop broken, engine torn loose in its mounts, and the right wheel in a semi-folded condition with the wing struts bent over the top of the wheel.

Not having filed a flight plan, I had no immediate prospects of a search starting out for me. The only thing to guide me out was the pipe line I had been following. It led an unknown distance to the pumping station and the emergency field I had passed earlier. No water and a long hike in the heat.

I started on my hike. Along the way, unknown to me at the time, I passed a watering hole for cattle not 50 feet from the pipe line. And I was so thirsty on that hike, which turned out to be 15 miles, that several times I sat down in the dust and debated which would be better —a glass of water or a cold beer. Water won out, but I didn't find it until I reached the station too tired and thirsty to ask the people for it. However, what I needed was obvious so they ministered to my needs and put me to bed. Not until next morning could I tell them the full story.

With amazing hindsight, I now know what I should have done to make that flight a successful one: Ship the luggage by a commercial carrier. Load only enough gas to reach my destination plus adequate reserve. Fly the mountains in the cool, cool, cool of the evening or early morning. Take an emergency kit with water and a can (*Continued on page* 62)

FLYING's

1955

RADIO REVIEW

THE TIME FINALLY HAS COME when airplanes seem to be primarily frames upon which to hang pieces of radio equipment. Increased utility for private and business aircraft has meant installation of more and more communication and navigation radio, until finally the issue of what-to-put-where has assumed very major importance.

Judging by the letters received from FLYING readers, decisions on purchase of airborne radio equipment present quite a problem. Some are buying their first radio installations, for of the 60,000 active private aircraft in the United States, almost 30,000 have no radio at all. Others indicate they are well along the road to adequate installations and are now contemplating dual omni receivers, additional VHF channels or such advanced equipment as DME.

In our efforts to provide information, we could find no overall industry listing of the many types of aircraft radio currently available. Since such a listing seemed to be fundamental to the problem, we rolled up our sleeves and went to work. And so did the industry. We are very much indebted to the manufacturers for their co-operation in providing material and assisting in preparation of our 1955 Radio Review.

A word of warning, however, is in order. Due to the limitation of space, it has been impossible to give full description of each piece of equipment. This is a real injustice to these fine and often highly complicated instruments. Furthermore, in the important column labeled "Approximate Price," we have attempted to give only the area of price since too many elements such as installation charges, voltage, extra crystals, power supply and taxes must be taken into consideration.

Finally, we make no claim to the complete accuracy of information. It is as accurate as a great deal of sweat expended in a limited amount of time could make it. Our aim was to present an overall picture and listing of airborne radio equipment. We trust it will be of service.

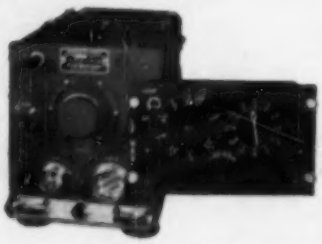
THE EDITORS

FLYING's 1955

AEROTRON

Model 300 VHF Receiver

ARC



R-11A LF Range Receiver

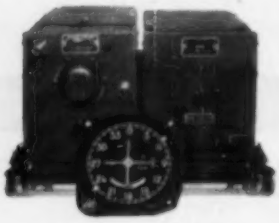
BENDIX

MN-53B Marker Beacon Receiver

AEROTRON

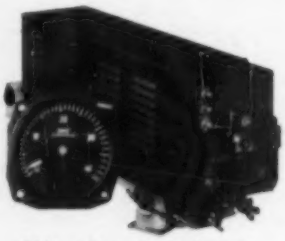
Model 200 VHF Transmitter

ARC



Type 15D VOR Receiver

BENDIX

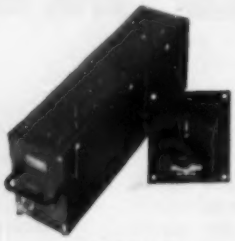


Distance Measuring Equipment

AEROTRON

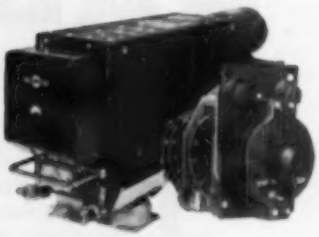
Electronic Direction Finder

BENDIX



RA-18B VHF Receiver

COLLINS

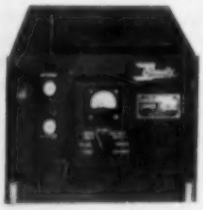


17L-4 VHF Transmitter

ARC

R-15 VHF Receiver

BENDIX



TA-18BB VHF Transmitter

COLLINS

51V-2 Glide Slope Receiver

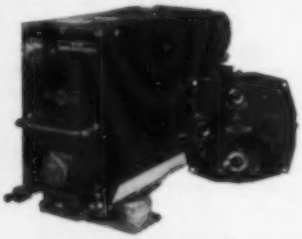
ARC

T-11B VHF Transmitter

BENDIX

MN-05F VHF Navigation Receiver and Omni Mag

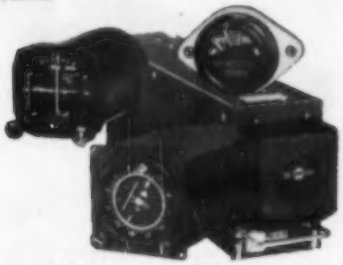
COLLINS



51Z-1 Marker Beacon Receiver

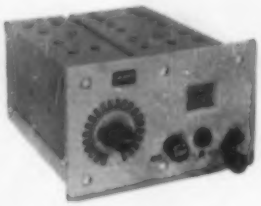
RADIO REVIEW

COLLINS



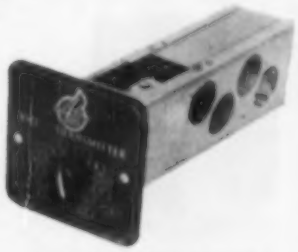
FD-102 Integrated Flight System

DARE



T-5/R-4 VHF Transmitter-Receiver

LEAR



RT-10 VHF Transmitter

COLLINS

618S HF Transceiver

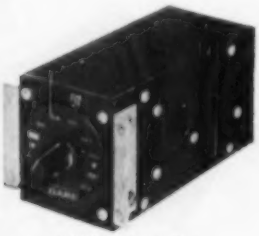
DARE

NI-1 Navigation Indicator

LEAR

LRA-6 LF Adapter

DARE



T-3 VHF Transmitter

GONSET

VHF Adapter

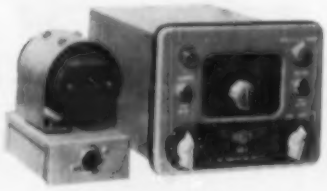
LEAR

ADF-12 "Orienter" Radio Compass

DARE

T-5 VHF Transmitter

GONSET

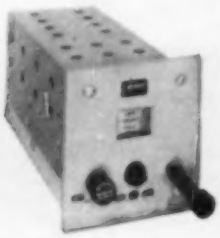


AR-1 VHF Transmitter-Receiver

LEAR

ADF-14 "Executive" Radio Compass

DARE



R-4 VHF Micro-Tuner Receiver

LEAR

LR-6 VHF Receiver

LEAR

Omnimatic Navigation System

LEAR

Omnimatic Omnirange Navigator

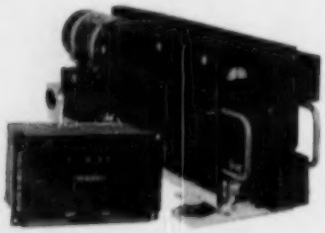
NARCO

LFR-1 LF Range and Broadcast Receiver

NARCO

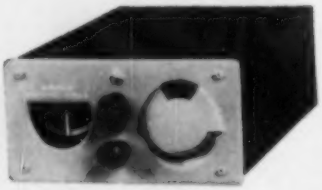
Distance Measuring Equipment

LEAR



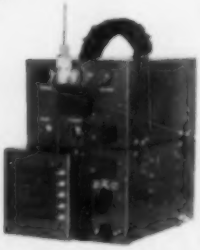
LTR-800 Transmitter-Receiver

NARCO



Omniplexer—Omni Converter

SKYCRAFTER



Portable VHF Transmitter-Receiver

MITCHELL

Airboy Sr—Portable VHF Transmitter-Receiver

NARCO

Simplexer—VHF Transmitter-Receiver

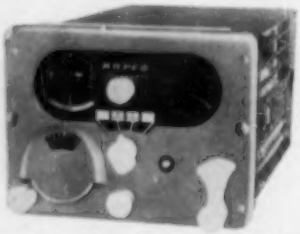
SPRINGER

AR-4 VHF Transceiver

MITCHELL

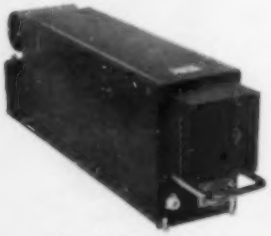
Avigator Jr—VHF Transceiver with Omni

NARCO



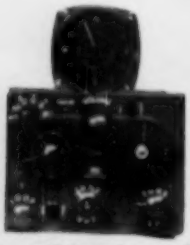
Superhomer—Transmitter-Receiver with Omni

WILCOX



421A Glide Slope Receiver

MITCHELL

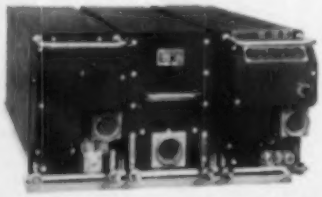


Avigator—VHF Transceiver with Omni

NARCO

Omnigator—VHF Communications and Navigation

WILCOX



440B VHF Airborne Communication System

FLYING's 1955 RADIO REVIEW

Manufacturer	Equipment	Model	Voltage Required	Weight	Power Source	Features	Approx. Price
AERONAUTICAL ELECTRONICS, INC. (AEROTRON) Raleigh, N. C.	Tunable VHF Receiver 108-128 mc	300	6-12-24	12 oz.	From Modulator/Power unit (extra) or any existing LF or VHF receiver	Automatic volume control, noise limiter and frequency control.	$99.50
	10-channel VHF Transmitter	200	6-12-24	8 oz.	From Modulator/Power unit (extra) or any existing LF or VHF receiver	Equipped with 5 crystals, provision for 5 more.	$79.50. Extra crystals $7.25 each
	Electronic Direction Finder	367	6-12-24	3 lbs.	Any LF Receiver	Fits standard 2¼" instrument space. Fixed loop.	$189.50
	HF Converter 4 channels, 3850 to 5700 kc	325	6-12-24	1 lb.	Any LF Receiver	Converts any LF or broadcast receiver to 4 crystal controlled HF channels. CAP 4585 kc supplied	$49.50. Extra crystals $7.25 each
	Modulator/Power Unit	220	6-12-24	4.7 lbs.	Any 6-12-24 volt system	Provides modulation and high voltage required for independent transmitter or receiver operation.	$79.50
AIRCRAFT RADIO CORP. (ARC) Boonton, N. J.	Tunable VHF Receiver 108 to 135 mc	R-15	14-28	8.8 lbs.	Built-in Dynamotor	Remote control. Covers entire VHF frequency band now assigned to civil flying.	$618.
	Tunable VHF Receiver 118 to 148 mc	R-19	14-28	8.8 lbs.	Built-in Dynamotor	Remote control. Identical to R-15 except for frequency coverage.	$618.
	Broadcast Receiver with Loop 520 to 1500 kc	R-10A	14-28	9 lbs.	Built-in Dynamotor	Remote control. For direction finding or homing on standard broadcast signals.	$593.
	LF Range Receiver with Loop 190 to 550 kc	R-11A	14-28	9 lbs.	Built-in Dynamotor	Remote control. For direction finding or homing on LF ranges, and night instrument flight.	$593.
	VHF/VOR Receiving Equipment 108 to 135 mc	Type 15D	14-28	17.4 lbs.	Built-in Dynamotor	Remote control. For VOR, runway localizers, VAR, and VHF communication. Indicator combines cross-pointer meter and course selector in one unit.	$2,118.84.
	75 mc Marker Beacon Receiver	R-20	14-28	2.6 lbs.	From VOR or LF Receiver	Visual-Aural type. Remote mounting.	$217.45
	VHF Transmitter 5 channels, 2 mc spread, 116-132 mc	T-11B	14-28	3.4 lbs.	From LF or VHF Receivers	Can be equipped with K-13 Relay for "whistle-thru" tuning and with adapter for 10 crystals.	$287.
	VHF Transmitter 5 channels, 2 mc spread, 125-148 mc	T-13A	14-28	3.4 lbs.	From LF or VHF Receivers	Can be equipped with K-13 Relay for "whistle-thru" tuning and with adapter for 10 crystals.	$287.
	VHF Transmitter 10 channel, 2 mc spread, 116-132 mc	T-21	14-28	3.6 lbs.	From LF or VHF Receivers	Same as T-11B but with 10 crystals rather than 5.	$352.
	VHF Transmitter 10 channel, 2 mc spread, 132-148 mc	T-23	14-28	3.6 lbs.	From LF or VHF Receivers	Same as T-13A but with 10 crystals rather than 5.	$352.
	UHF/VHF Transmitter-Receiver 20 channels VHF, 116-148 mc 8 channels UHF, 228-258 mc	Type 12 UHF/VHF	28	22 lbs.	Built-in Dynamotor	Remote control. Control unit combines control of both VHF and UHF equipment.	Depends on channels required. About $2,500.
BENDIX RADIO Baltimore, Md.	VHF Receiver 118 to 135.95 mc	RA-18B	28	21.3 lbs.	AC Source or built-in Dynamotor	Remote control. 360 channel crystal control with 50 kc spacing.	On Request
	VHF Transmitter 118 to 135.95 mc	TA-18BB	28	43 lbs.	AC Source or built-in Dynamotor	Remote control. 360 channel, crystal controlled. 35 watts nominal output.	On Request
	VHF Transmitter 118 to 135.95 mc	TA-20A	28	25 lbs.	AC Source or built-in Dynamotor	Remote control. 360 channel, crystal controlled. 25 watts nominal output.	On Request
	VHF Navigation Receiver	MN-85F	28	27 lbs.	AC Source or built-in Dynamotor	VOR, Localizer, VAR, and VHF communication reception on 280 crystal controlled channels.	On Request
	Omni-Magnetic Indicator	MN-97		3 lbs.		One indicator for Omni, ILS, magnetic heading and marker. Used with MN-85 VOR Receiver (above).	On Request
	Glide Slope Receiver 20-channel fixed frequency	MN-100	28 v DC and 115-400 cycle AC	12.8 lbs.	Dynamotor and Inverter (extra)	Remote control. Uses Omni-Mag indicator or conventional cross-pointer indicator.	On Request
	Marker Beacon Receiver	MN-53B	28 v DC and 115-400 cycle AC	13 lbs.	Dynamotor and Inverter (extra)	Remote control. Visual-Aural reception of 75 mc, Fan, Inner and Outer Markers. 3-light indicator.	On Request
	ADF Radio Compass 4 bands, 100 to 1750 kc	MN-62	28 v DC and 115-400 cycle AC	54 lbs.	Dynamotor and Inverter (extra)	Remote control. Several types of bearing indicators available.	On Request
	ADF Radio Compass 90 to 1750 kc	DFA-70A	28 v DC and 115-400 cycle AC	25 lbs.	Dynamotor and Inverter (extra)	Remote control. Features flush mounted loop antenna.	On Request

FLYING's 1955 RADIO REVIEW

Manufacturer	Equipment	Model	Voltage Required	Weight	Power Source	Features	Approx. Price
BENDIX RADIO Cont'd.	Distance Measuring Equipment	DME-5A	28 v DC and 115-400 cycle AC	29 lbs.	Dynamotor and Inverter (extra)	Electronically computes distance from a DME/VOR station. Indicates 0 to 40 or 0 to 200 miles.	On Request
COLLINS RADIO COMPANY Cedar Rapids, Iowa	VHF Communication-Navigation Receiver, 108-136 mc	51R-3	27.5	29.5 lbs.	From Dynamotor power unit (extra)	Remote control. Provides 280 crystal controlled channels with 100 kc spacing.	On Request
	VHF Communication Receiver 118-136 mc	51X-1	27.5 or AC	28.3 lbs.	Dynamotor power unit (extra) or transformer-rectifier type supply.	To fulfill all present and contemplated future VHF communication requirements for civil aircraft. 360 remote controlled channels with 50 kc spacing.	On Request
	VHF Transmitter 118-138 mc	17L-4	27.5	29 lbs.	From Dynamotor power unit (extra)	Remote control system. Provides 360 crystal controlled channels. 25 watt output.	On Request
	HF Transceiver 2.0 to 25.0 mc	618S	27.5	51 lbs.	From Dynamotor power supply 416W-1 (extra)	144 channel crystal controlled. 100 watt. All required and anticipated frequencies for global communications.	On Request
	VHF Marker Beacon Receiver	51Z-1	27.5 or AC	15 lbs.	Dynamotor or Transformer Rectifier (extra)	Crystal controlled reception of 75 mc Marker Beacon signals. Visual and aural indication.	On Request
	UHF Glide Slope Receiver 329.3-335.0 mc	51V-2	27.5 or AC	15 lbs.	Dynamotor or Transformer Rectifier (extra)	Remote selection of any of 20 glide slope channels. Together with 51R Navigation Receiver, it fulfills all ILS glide slope and localizer requirements.	On Request
	Integrated Flight Systems	FD-102 & FD-103	27.5 or AC	29.7 lbs.	Dynamotor or Transformer Rectifier (extra)	Include 51R-3 Communication-Navigation Receiver, Approach Horizon, Course Indicator, Steering Computor, Vertical Gyro and Gyro Monitor.	On Request
DAYTON AVIATION RADIO & EQUIPMENT CORP. (DARE) Vandalia, Ohio	10 channel VHF Transmitter 121-123 mc	VHF-T-3	12-24	15 oz.	MPS-4 Dynamotor (extra)	Crystal controlled. 3 to 4 watt output.	$75. Plus crystals at $10 each
	10 Channel VHF Transmitter 121-123 mc	VHF-T-4	12-24	1.2 lbs.	MPS-4 Dynamotor (extra)	Remote control.	$135. Plus crystals
	22 Channel VHF Transmitter 118-127 mc.	VHF-T-5	12-24	1.5 lbs.	MPS-4 Dynamotor (extra)	3 to 4 watt output.	$160. Plus crystals
	22 Channel VHF Transmitter 118-127 mc	VHF-T-5R	12-24	1.8 lbs.	MPS-4 Dynamotor (extra)	Remote control.	$250. Plus crystals
	VHF Micro-Tuner Receiver 108-128 mc	VHF-R-4	12-24	2.8 lbs.	MPS-4 Dynamotor (extra)	Every 1/10th mc marked on stainless steel tape. Built-in VOR or VAR-Loc. switch. Remote control model available.	$298.
	VHF Transmitter-Receiver Trans. 118.1-126.7 mc Rec. 108-128 mc	T-5 & R-4	12-24	4.2 lbs.	MPS-4 Dynamotor (extra)	Combines T-5 22 channel transmitter and R-4 receiver in one unit. Fits standard glove compartment.	$458. Plus crystals
	Navigation Indicator	NI-1	12-24	1.5 lbs.		Rotatable azimuth, Left-Right indicator, To-From indicator, precision helipot. In one unit.	$295.
	Omni Converter	OC-3	12-24	4.5 lbs.	MPS-4 Dynamotor (extra)	Used with Receiver and Navigation Indicator, gives omni bearing information. Receiver switch changes from VOR to VAR-LOC.	$298.
	Modulator Power Supply	MPS-4	12-24	8.5 lbs.		Includes dynamotor, filter components, transmitter speech amplifier, receiver audio output stage and modulator in one unit.	$140.
GONSET COMPANY Burbank, Calif	VHF Transmitter-Receiver 8-channel transmitter Receives 108-128 mc	AR-1	12-14.5	4.4 lbs (Power Supply 3.3)	Dynamotor (extra)	2 crystals supplied. Provision for LF and omni. Intercom switch. Receiver crystal calibrated on transmitting channels.	$269.50 Dynamotor $30.
	VHF Adapter 108-128 mc		6-12	2 lbs.	Existing Power	Attaches to LF or MF receiver. Permits simultaneous reception of VHF and LF signals if desired.	$69.50. With squelch $79.50
LEAR, INC. Los Angeles, Calif.	Tunable VHF Receiver 108-127 mc	LR-6	14-28	3.9 lbs.	Dynamotor (extra)	May be combined with other units (see Model LTRA-6) Provides modulation power for transmitter.	$249. Plus $55 for dynamotor
	12 Channel VHF Transmitter 119-123	RT-10	14-28	10 oz.	Modulation from VHF receiver or ADF	May be used as Model LTRA-6 unit. 2 crystals supplied. Fits ashtray or stand. Instrument hole.	$132.
	LF Adapter 200-400 kc; 550-1600 kc	LRA-6	14-28	1.3 lbs.	From Parent Receiver-Transmitter Unit	Uses audio output system of LR-6 VHF Receiver. Independent volume control.	$149.50
	Omnimeter Omnirange Navigator	2214-2215	12-28	12.9 lbs.	Separate power supply unit included	Course Selector combined with To-From and Left-Right indicators. Includes converter and meter.	$495.
	Omnimatic Navigation System		14-28	16.4 lbs.	Omnipack power supply included	Gives magnetic bearings on picture scope. Works through separate VHF receiver.	$397.
	Combination "DM"	LTRA-6	14-28	19 lbs.	Built-in	18 "building block" combinations are possible. This one includes Tunable VHF Receiver, VHF Transmitter, LF and Marker Beacon Receiver, and Omnimeter-Omni System.	$987.

Manufacturer	Equipment	Model	Voltage Required	Weight	Power Source	Features	Approx. Price
LEAR, INC. Cont'd.	36 Channel VHF Transmitter-Receiver 118.1-126.7 mc	LVTR-36	14-28	23 lbs.	Built-in	Remote control. No crystals supplied. One required for each trans. or rec. channel up to 36.	$1,395. Plus crystals
	800 Channel VHF Trans.-Receiver 108-147.95 mc with 50 kc spacing	LTR-800	12-24	20 lbs.	Built-in	Remote control. Receiver and transmitter may be controlled independently and used on same or different freq. Requires 60 crystals for full coverage. Provides navigation information output.	On Request
	Marker Beacon Receiver 75 mc	2200	14-28	11 lbs.	Built-in	Visual and aural signals. Light panel provides 3 press-to-test lights.	$595.
	ADF-12 "Orienter" 190-430 kc; 480-1725 kc	ADF-12	14-28	7.5 lbs.	Included in Amplifier	Combined automatic direction finder (radio compass). LF broadcast-range-communications receiver Panel mounted tuner.	$890.
	ADF-14 "Executive" 190-430 kc; 480-1725 kc	ADF-14	14-28	18 lbs.	Included in amplifier	Greater sensitivity. Ruggedized to stand vibration of multi-engine planes. Built-in tuning meter. Panel mounted tuner.	$1495.
	Remote Control ADF	ADF-R14	14-28	25 lbs.	Included in Amplifier	Same as above with remote tuner.	$1995.
	ADF-15A Radio Compass 190-430 kc; 480-1725 kc	ADF-15A	14-28	16 lbs.	Included in Amplifier	Latest in Lear Radio Compass series. Meets Military and CAA specs. Generally same as ADF-14, has panel-mounted console tuner.	On Request
MITCHELL INDUSTRIES, INC. Mineral Wells, Texas	Portable VHF Trans; LF Receiver 200-410 kc; 550—1550 kc	Airboy Sr. AT-92-50		5 lbs.	Dry Battery	3 crystal capacity, 2 supplied. Built-in loudspeaker. Converter for 110 v. AC available.	$133.75
	VHF Transceiver with Omni 6 channel trans.; Rec. 108-130 mc	Avigator Jr. AT-91-47	6-12	20 lbs.	Built-in Vibrator	2 crystals supplied. Available with LF Receiver in separate unit and with or without omni.	$467.79
	Communication-Navigation Set 108-130 mc; 200-410 kc; 550-1550 kc.	Avigator AT-99-45A	12	21 lbs.	Built-in Vibrator	6 channel transmitter, VHF and LF receivers, omni with indicator, whistle dir. finding.	$765.
	LF Transmitter-Receiver Trans. and Rec. on 3023.5 Rec. 200-410 kc; 600-1750 kc	Export Avigator AT-99-44D	12		Built-in Vibrator	For use in Latin America. Includes rotatable loop. Panel decals in both English and Spanish	$500.
NATIONAL AERONAUTICAL CORP. (NARCO) Ambler, Pa.	VHF Transmitter-Receiver Trans. 118-127 mc Rec. 108-127 mc	Simplexer VC-12	6-12-24	2.8 lbs.	Power Supply extra or from Omnigator	12 channel transmitter with "whistle-stop" tuning. Tunable receiver. Crystals extra.	$250. Plus crystals at $10 each
	Omni Converter	Omniplexer VOA-2	12-24	2.2 lbs.	From Simplexer unit	Attaches to Simplexer to provide omni navigation course selector, Left-Right and To-From.	$195.
	VHF Transmitter-Receiver and Omni 108-127 mc	Superhomer VHT-2	12	10.5 lbs.	Built-in	2 crystals supplied for 4 channel transmitter. Tunable VHF receiver. Vernier omni course selector, Left-Right needle also serves as To-From meter.	$495.
	VHF Communication and Navigation 108-127 mc	Omnigator VTR-1	12-24	18.5 lbs. inc. power supply	Separate unit but included in price	3 crystals supplied for 8 channel transmitter. Tunable VHF receiver. Precision course selector. Left-Right and To-From indicators. Localizer and marker beacon switches. Beacon aural only.	$875.
	LF Receiver 200-400 kc; 540-1560 kc	LFR-1	12-24	2 lbs.	From Omnigator, Superhomer or Separate unit	Reception on LF range and standard broadcast. Can be equipped with loop for direction finding.	$99. Loop Adapter kit $20.
	Distance Measuring Equipment	UDI-1	13.5-27	32 lbs. complete	Built-in	Gives exact information on distance from a VOR-DME station or ILS localizer. Distance indicated on panel-mounted instrument, 0-200 mile range or 0-20 miles for approach operation.	$4990. Plus $139. For channel selector switch if desired.
SKYCRAFTERS AVIATION RADIO Long Beach, Calif	Portable VHF Transmitter-Receiver. 3 models with freq. coverage between 112-172 mc	Multiphone TRV-122; 142 or 162		10-12 lbs. depending on power used	Dry battery, power pack, or 115v AC	Crystal controlled VHF receiver and transmitter. When Multipower Pack is used, Multiphone may be plugged into cigarette lighter in car or plane or operated from 115 volts AC in home or office.	$248 with battery $306.65 with power pack
EARL W. SPRINGER AIRCRAFT RADIO CO. Indianapolis, Ind.	VHF Transceiver 108-136 mc	AR-4		4 lbs. plus battery	Dry Battery	Designed for voice communications in traffic contol areas. 3 crystals furnished.	$187.50 plus battery.
WILCOX ELECTRIC COMPANY, INC. Kansas City, Mo.	VHF Airborne Communications System 180 channel transmitter-receiver 118-135.9 mc, 100 kc spacing	440B	28	77.8 lbs. complete	Includes separate power unit	Crystal controlled transmitter and receiver. Provision for 70 crystals, 35 each for transmitter and receiver. 50 watt output.	On Request
	Glide Slope Receiver UHF 329.3-335 mc	479A	28	23.5 lbs.	Built-in for AC or DC power	Provision for all 20 channels assigned to glide slope service world wide.	On Request
	Computing Automatic Tracker (CAT)	441A	28v DC and 115-400 cycle AC	8 lbs.	Dynamator and inverter	For precision ILS approaches. Adds "heading sense" to approach. Includes modification of a standard Omni-Bearing Selector instrument.	On Request

FLYING FARMERS

By BILL RENSHAW

COCKTAILS OUT

Many aviation organizations look with disfavor on the serving of liquor at flying events. Flying farmers of the Midwest recently protested a cocktail hour so vigorously that it was struck from the program. The occasion was the visit of a group of FF's to a military installation.

It developed that at least one cocktail party had been scheduled for each of the three days involved in the visit. Officers in charge gladly eliminated all alcoholic beverages and refunded each FF an amount greater than that charged for barracks and chow.

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MIGRATION

Farm folks used to take the honking of wild geese as they migrated southward as a sign that winter was only a few days away. Today, the goose is being replaced as a harbinger of cold weather by flying farmers who hurry through their harvest so they can be winging their way South before the first snow flies.

Some fly to one of the lands of sunshine on organized tours, like the flight to Florida and Cuba, sponsored by the National Flying Farmers' Association. It was made the early part of December and drew FF's from most every section of the nation.

Far larger, however, in point of numbers are the flights made by individual FF's who have a favorite spot where they spend a few wintry months. Of all choice spots, the Rio Grande Valley seems to get more than its share of FF's, especially among those from the Midwest. Main attraction seems to be the highly productive soil.

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LANDING FEE

An announcement that a landing and parking fee is to be charged at the Purdue University Airport has flying farmers "hopping mad." Most flying farmers are college-minded; many have sons enrolled in this famed university; many, many, more are alumni; and literally hundreds fly to Purdue every year on university business. To all these and hundreds more, the welcome sign is being removed from the threshold by this unprecedented act.

The feeling of flying farmers was pretty well expressed in a resolution adopted by Midwestern FF's in their annual Clinic held recently in Battle Creek, Mich. Calling the action unprecedented, unwise, and ungracious, the resolution called on Purdue officials to either remove the landing fee or else operate the airport on a purely commercial basis.

Flying farmers point to their organized efforts to get their members to fly to events staged at various Midwestern agricultural colleges. "This landing fee," they say, "will certainly discourage flyins from other states as well as from Indiana." They point particularly to swine days and cattle feeder meetings which normally draw many farmers from other states.

Carl Thorp, a leading Illinois flying farmer speaking at the Battle Creek Clinic, said that several ag colleges that did not have landing strips have constructed such facilities for the benefit of flying farmers and others. He pointed to Michigan State College as an example.

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NFF CONVENTION

The next National Flying Farmers Convention, it now appears, will be held at Michigan State College instead of in the Detroit area as originally planned. The convention will be held in August, 1955; the exact dates will be given later.

Michigan State College, located at East Lansing, Mich., has a lot of an agricultural nature to attract flying farmers. It is America's oldest land grant college. It does not have much of interest in the way of aviation, but that will be taken care of by side trips to Detroit.

Michigan State College, it is argued, also has a lot to offer in the way of campus facilities. It is well equipped to serve such a convention from the standpoint of food and lodging.

A quick survey of Midwest FF sentiment shows almost 100 per cent approval of Michigan State College over Detroit as the convention site.

FF's pulling for MSC point out that most flying farmers were farmers before they were flying farmers and that it is wise to keep many events close to the soil.

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GOOD BUSINESS

Farming from the air is now a $54,000,000 business and ranks as the third largest phase of civil aviation, reports the Journal of Agricultural and Food Chemistry. The air time of 700,000 hours logged by agricultural aviators last year was exceeded by only two other non-military groups—the domestic airline pilots and those in executive aviation. By the end of 1952, there were more than 2,000 crop-dusting firms operating 7,000 aircraft, treating 40 million acres from the air.

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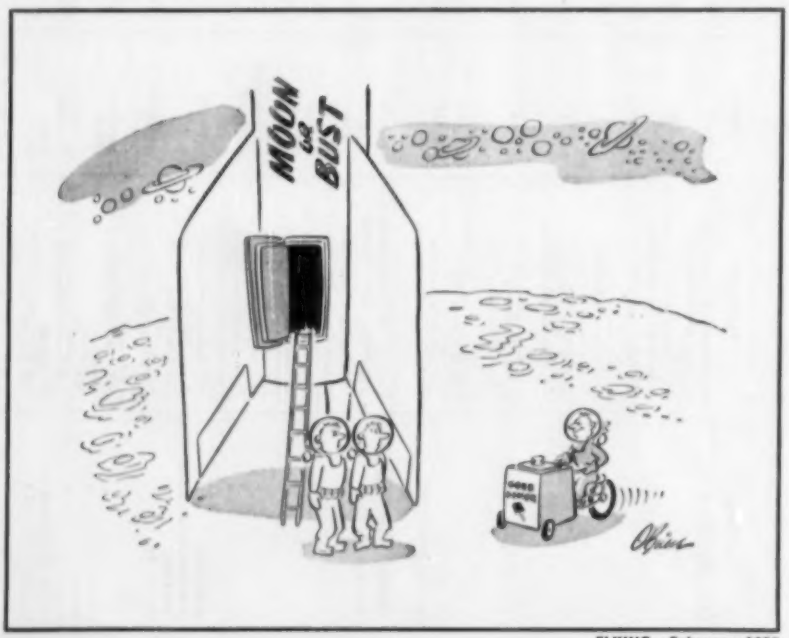
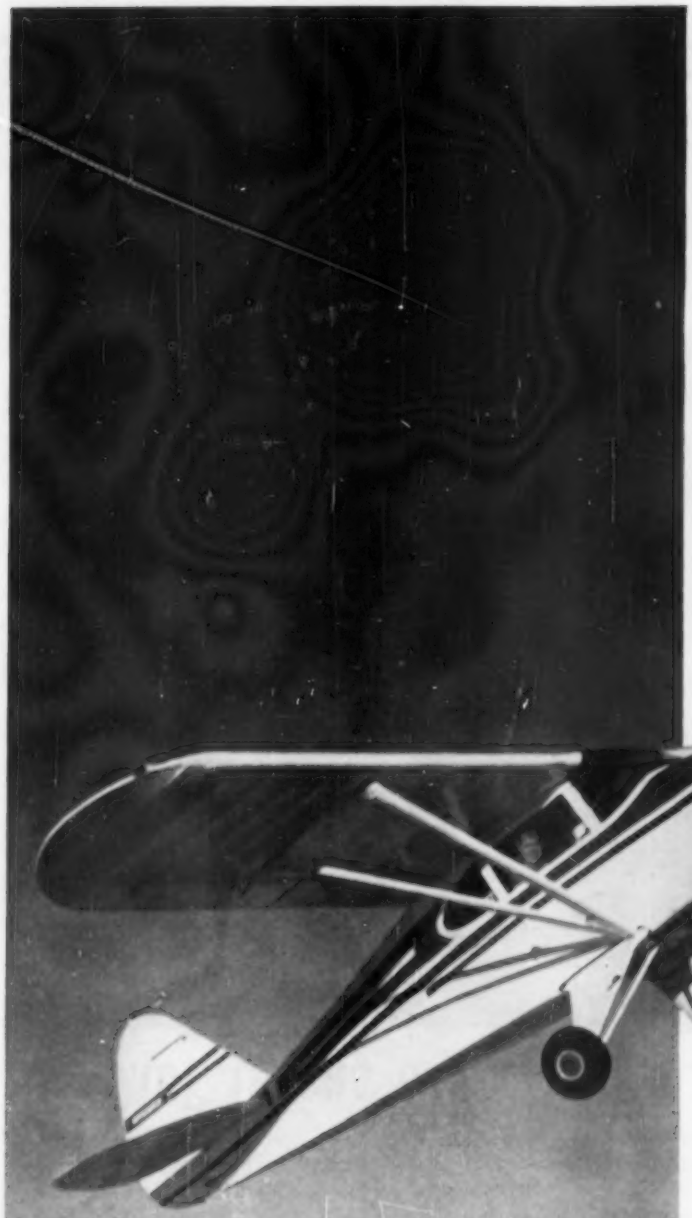
EUROPEAN TOUR

Scandinavian Airlines recently announced that Louis Bromfield, the well-known author, would conduct a Friendly Farmers Tour to Europe from March 6 through April 13. Limited in size, the tour which is first-class throughout, leaves in two groups on March 6 and 7; one from New York for Copenhagen, aboard an S-A-S Royal Viking Deluxe, while participants originating in the western part of the U. S., will depart from Los Angeles via the new and exciting Arctic route to Europe which S-A-S inaugurated in November.





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AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

INSURANCE

According to Minnesota Mutual Life Insurance Co., the AOPA life insurance program has proved to be the biggest of its kind ever underwritten by the company.

In a period one month short of three years, AOPA members bought approximately $18,000,000 worth of insurance protection under the program which was limited to $5,000 per person during the period.

The AOPA program proved so successful that Minnesota Mutual raised the limit to $20,000 per eligible person. It also proved to the insurance industry that AOPA pilots are good life insurance risks without the need for added heavy premiums usually demanded for "hazardous" occupations. As a result many companies have re-evaluated their stands on the degree of hazard supposedly present in aviation, and have reduced most additional premiums for pilots as a group.

Since April 1, 1954, when the limits of the AOPA-Minnesota Mutual policies were raised to $20,000 per eligible person, AOPA'ers have purchased nearly $6,000,000 more coverage to swell the AOPA group program total to approximately $24,000,000 of paid-up insurance protection. And it's all-risk insurance that pays off no matter what the death cause—plane wreck or rocking chair.

PHONETIC COSTS

After 24 months of Government-financed research on the International Civil Aviation Organization (ICAO) phonetic alphabet, and unknown thousands spent trying to educate pilots to use it, the Air Coordinating Committee (ACC) has announced itself ready to propose changes to ICAO.

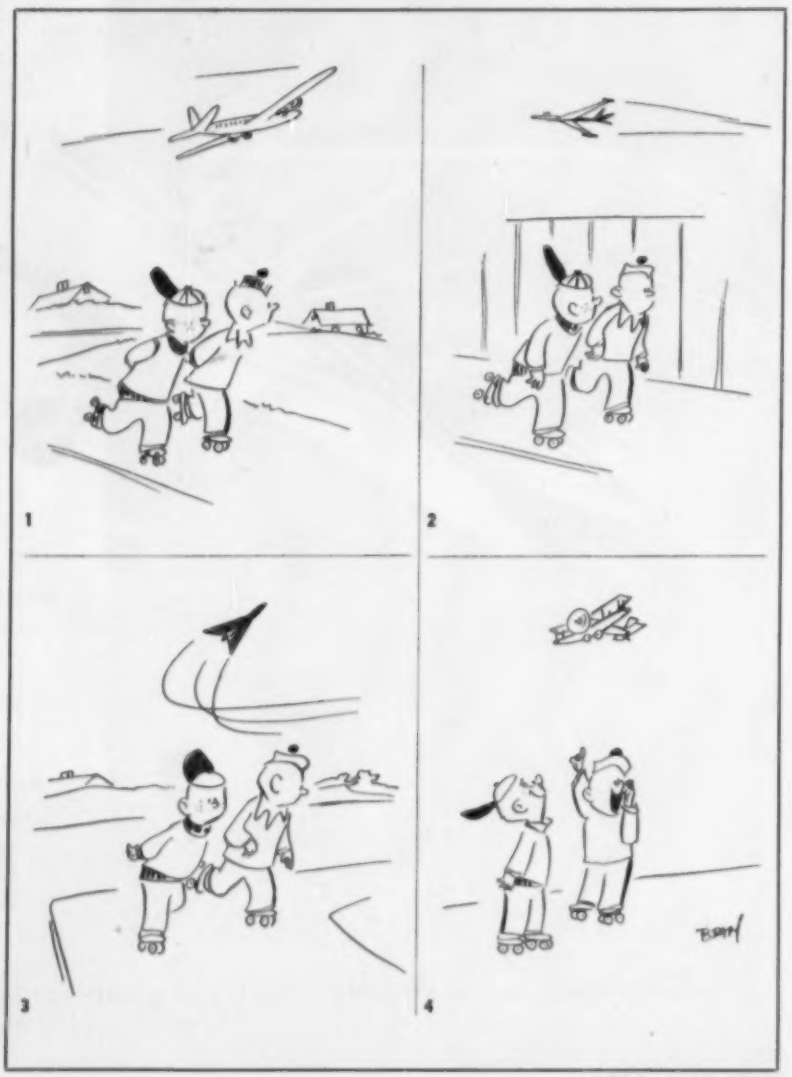
The suggested improvements are: Coca back to Charlie, Extra back to X-ray, Metro back to Mike, Nectar to November and Union to Uniform.

ACC's latest proposal comes as a result of an Ohio State University study made under contract to the Air Force Research and Development Command's Human Factors Operations Research Laboratories (HFORL).

The study, described in HFORL Report No. 38, was made to evaluate the relative phonetic effectiveness of the old Able-Baker-Charlie alphabet and the new ICAO one. According to the Air Force, the evaluation made by Ohio State cost about $10,000. Conclusions in the report are that Alpha-Bravo-Coca is the better alphabet of the two, so long as the above changes are made.

Most AOPA members and other civil pilots who are being forced to use the ICAO alphabet in practice because it is the Federal airways' standard—although there is no regulation making its use mandatory—keep wondering why there is so much fuss and expense over what they feel is a relatively simple matter. AOPA is frequently asked "What was the need for change in the first place?" There seems to be no answer to the question, except that certain Government planners believe that things should undergo change periodically, whether they need it or not.

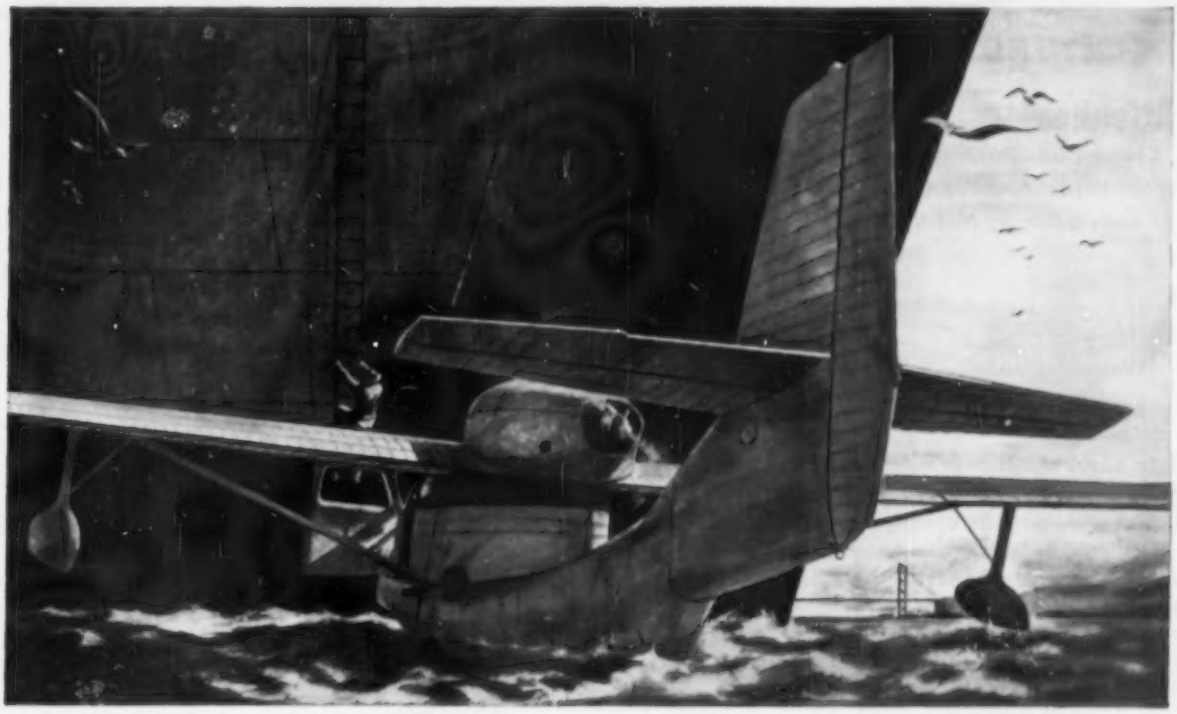
An AOPA spokesman recently expressed the consensus when he said, "At this rate—three returns to the old alphabet per each two-year-exposure to the scientific method—it will take around $70,000 for research, no one knows how much for continuous pilot re-education programs, and another 14 or 15 years before we get completely back to Able-Baker-Charlie, which AOPA insisted in the beginning was good enough for world wide use."



PLANE FAX

Your Best Week-end Flight Plan for February

Fly to a week-end of sun and fun at Tucson, Arizona, where the 30th annual Fiesta De Los Vaqueros will be held February 24 to 27. Plan to land at Downtown Airport, Gilpin Airport, or Tucson Municipal for quality Standard Aviation products and service.



Flying rescue experts to a stranded freighter

Quick delivery! When a freighter went aground last February in San Francisco Bay, Bob Law of Commodore Air Service, Sausalito, flew marine engineers to the ship less than an hour later. They were able to get the freighter afloat on a rising tide the same morning.

"Our amphibians make many emergency trips over the bay," says Mr. Law. "In addition, we make daily flights to Clear Lake resorts over 100 miles of hilly forest, and fly as many as 40 sightseeing trips a day above San Francisco. We use RPM Aviation Oil to keep our engines in top condition for this rugged work. It gives us hundreds of flying hours between overhauls, and holds down oil consumption right up to overhaul time. 'RPM' keeps rings free, too. We've never had a stuck ring—really exceptional for planes making frequent take-offs from water under very high power.

"We have no trouble with detonation on water take-offs, either, since we switched to Chevron 80/87 Aviation Gasoline. It gives us extra power when we need it, yet never fouls plugs even during long periods of idling."

T.M.'S "RPM," "CHEVRON," REG. U.S. PAT. OFF.

TIP OF THE MONTH

If you're not used to landing on really smooth water, remember that it's impossible to judge altitude over a glassy surface. It's wise to set up a landing attitude on the final approach, and descend slowly with power.

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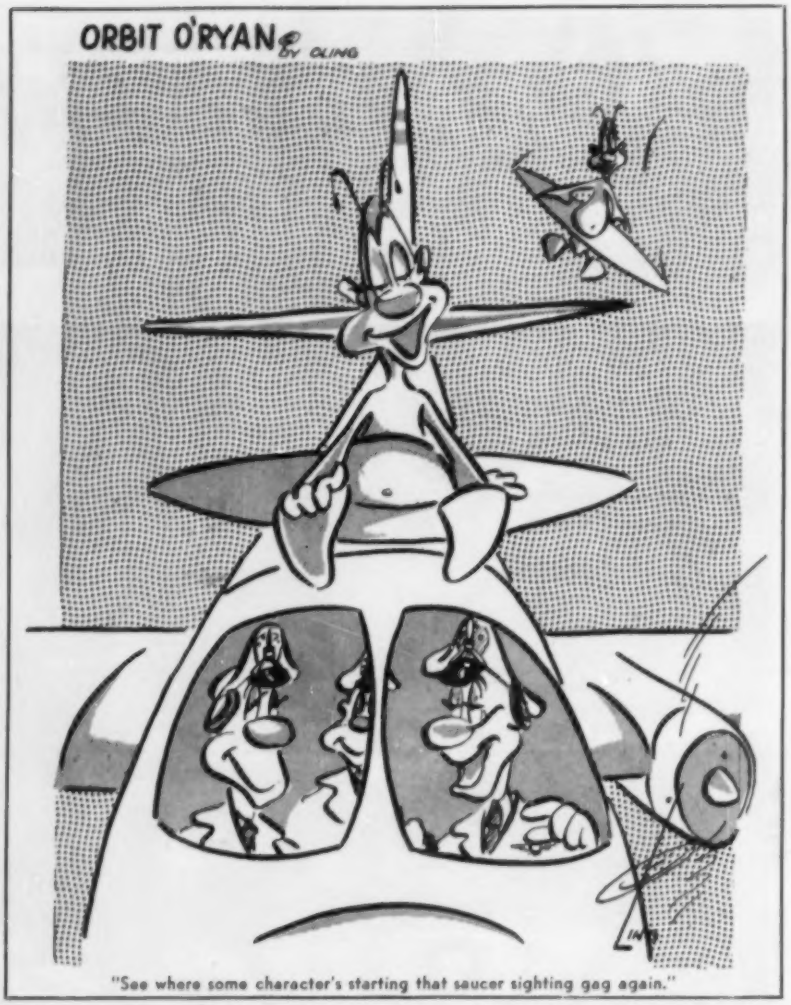

"See where some character's starting that saucer sighting gag again."

Red Overcast in the Pacific

(Continued from page 15)

defense against such retaliation.

America's checkmate to this plan, of course, is to have strong allies in Korea and Formosa. As long as these areas hold firm, the Soviet utilization of Red China's airpower is thwarted. And how well Russia understands this fact! Thus its treacherous concentration upon building its forts and air bases in Northern Korea in violation of truce agreements, and its preparations to jump the Republic of Korea if U. S. airpower is withdrawn.

Even rumor of such withdrawal has already caused Communist jeers that the Republic of Korea is courting its own crucifixion. But Korea has had a long history in the human struggle for freedom and will never cringe and never, never stoop to the international blackmail of appeasement. Nor do we ask that foreign soldiers soak our land with their blood. We will use our own blood to be free. What we do ask is the tools to defend ourselves—the modern tools and instruction in how to use them. What we ask is sea blockade and air cover. With these we will roll to the Yalu against Mao.

A united Korea would greatly change the Soviet Schedule of Pacific conquest. It would restore much face to America's lost prestige in the Orient. It would stalemate Red China's program to negate American strategic air power. And it would accomplish all this at a time when Russia is not yet ready for launching of her war of global conquest.

Yet America should understand that zero hour in the Pacific is very close. There is still time to break the Red monster before it fully matures, but that time is now, before Mao, driven by the Kremlin, matures this vast air program.

The place to begin is with the unification of Korea. Give us the power to redeem and fortify our own country and the free world will be provided with the strongest and most strategic bastion possible in the far Pacific. This is not a matter of mere justice. It is a matter of life to Americans as well as Koreans. END

Why I Quit Instructing

(Continued from page 35)

airport records, the dispatcher stopped filling in the file card and looked at me.

"How'd you like an instructing job?"

I looked out the window. It was starting to rain.

But it wasn't washing out my living. "No, thanks," I said, "Can't afford it." END

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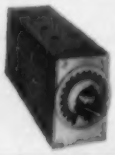
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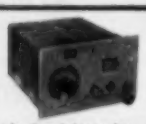
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The Rev. Paul Robinson, director of missionary aviation at Moody Bible Institute and Paul Wertheimer, instructor, took off from the Moody-Wooddale airport in a 65 hp Piper tandem training plane to show newspaper, radio and television reporters, military and civil aviation authorities just how the thing works.

When the plane was in the air, the canvas bag or "bucket" was let out of the cockpit to the extent of the rope. Fifteen hundred feet of sash-cord, operated on a hand winch, was used in this case. The bucket trailed horizontally behind the plane until Robinson, the pilot, began to circle at about 600 feet. The circle was some 1,000 feet in diameter. As they circled, the canvas bucket began to spiral down and finally landed gently on the ground and remained there as long as the plane circled. The bucket was now the lowest point of a huge, invisible cone.

The bucket can be landed within inches of any desired spot. A big white X on the ground was the target for Robinson and Wertheimer and they hit it every time.

Medical supplies or other equipment could thus be lowered to isolated missionaries in the jungle, or standard explorers, or a hard-pressed company of GI's where perhaps even a helicopter couldn't land.

During their demonstration, Robinson and Wertheimer lowered a magnetic telephone in the bucket and carried on an air-to-ground conversation which was relayed over the loud speaker system for the benefit of spectators.

This radical and amazingly simple technique was discovered by Nate Saint who is a missionary aviator—a "bush" pilot missionary—in Ecuador, South America. He has used this device a good deal in his work in the jungle.

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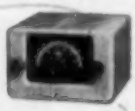

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Crosswind Landings

(Continued from page 31)

therefore, the length of runway required will be less than that needed in a calm.

Now comes the difficult part of the maneuver, but a part which has been made easier by a precise, controlled approach.

Look out far ahead of the plane. This will enable you to estimate the drift and height with more accuracy. Then, still keeping the plane flying down the runway line by varying the aileron and rudder pressures as necessary, level off near the ground and land wheels first.

Just before touchdown, rudder the plane straight down the runway and pick up the low wing as required—sometimes a simultaneous motion, sometimes a delayed motion. In a delayed motion you land on the windward wheel first. Push the stick gently but firmly forward to get on the ground and be sure to keep rolling straight ahead with lots of rudder control, judicious brakes if needed, and ailerons.

The use of ailerons is controversial, but if a wing goes down there is only one thing to do: keep the nose straight with the rudder and hope that the aileron will bring the wing back up. The ailerons are less effective at low speeds in one type aircraft than another, but experts agree that, as long as there is airflow over an aileron, there will be lift. It is in the 90-degree crosswind that the aileron is most ineffective.

It is also in the 90-degree cross-wind that the fuselage has most tendency to weather-cock (and groundloop) the landed airplane. (A plane won't weathercock in the air, but it will on the ground!) Take prompt, firm action to keep the path of the roll-off straight down the runway, but don't be so firm that the brakes are abused. Braking is most effective and least dangerous after the rudder becomes ineffective.

As soon as you can, after touchdown, lift the flaps; this will mitigate the chance of a gust taking you off the ground again. In a conventional airplane, bringing the flaps up is a must, because as the tail goes down the lift increases and a small gust can easily create enough lift to raise the plane and drop it heavily back on the ground. Some pilots ask, "Why use flaps anyway in a crosswind or strong wind?" The answer is that some aircraft are much more stable with one-quarter flap; and with winds under 20-24 knots a bit of flap can do no harm. Certainly in a 40-knot wind there is no need to use flap except for stability purposes. This is another item which each pilot must figure out according to the situation. If all situations were cut-and-dried and solved by a simple rule there would be no need for articles on the subject!

It will be noted that a wheel landing was recommended in a cross-wind. There can be little argument about this, as the wheel landing provides better control, is less susceptible to gusts, and on touchdown the plane tends to swivel around its center of gravity and roll in the direction of motion. Finally, if the wing is down and a one-wheel landing is made, the airspeed is still high enough to provide aileron control, and by the time the tail

SMALL FRY

Young America takes a peek from a vantage point at sonic speed Boeing B-47 bombers on the flight line at the Lockheed-operated Government Aircraft Plant at Marietta, Ga. To be cowboys or space patrolmen seems to be the question before them.

wheel touches the ground the situation should be well in hand.

METHOD TWO. When the wind-angle is 90 degrees with higher wind velocities, the simple wing-down method is not sufficient to counteract drift, and another method must be used. On Final Approach, turn the airplane into the wind and crab sufficiently to maintain your path above the runway line, just as one does on a cross-country flight. The heading will have to be varied during the descent because of changes in wind velocity or direction. Maintain the same airspeed over the fence and, before touching down, turn the plane with the rudder so that the heading is parallel with the roll-off direction or runway.

Needless to say, this method is difficult to time and control, especially in large or multi-engined aircraft. For this reason most pilots prefer the combination of Methods One and Two.

COMBINATION METHOD. You may ask, "But how does one know when, or if, to combine these methods?" If possible, say in a light wind or in a large plane, use the first method. It is easy, involves less risk and calls for less technique. In stronger winds involving larger drift angles, combine the two.

There are a few finer points of crosswind landing technique. Some pilots like to land diagonally across a large runway, a method quite feasible in a lightplane. In crosswinds of 90 degrees, the landing speed is almost the same as landing in a calm, and flap should be used with the precautionary thought that a long, difficult roll-off will follow the touch down. For pre-solo students a wing-level, skid method is often taught to correct drift close to the ground, inasmuch as the student seldom realizes that a wing is down anyway! END

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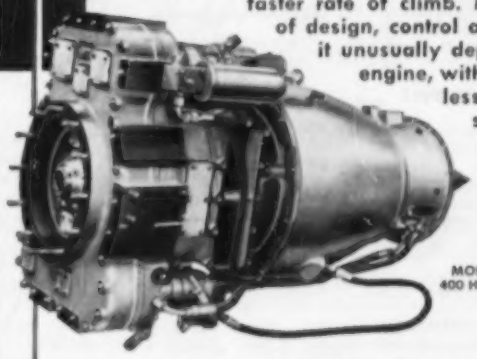
SIKORSKY'S XH-39 is notable for high performance—increased cruising speed, improved hovering ability, and faster rate of climb. Moreover, its simplicity of design, control and maintenance makes it unusually dependable. Although the engine, with all accessories, weighs less than 250 pounds, the ship accommodates up to 800 pounds of cargo. Payload space, in addition to pilot, is 81 cubic feet.



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Latest in a steadily-lengthening list of applications in which C. A. E. gas turbines are performing with distinction is this advanced helicopter, the Sikorsky XH-39. It is powered by the 400-h.p. C. A. E. Model 220 fixed shaft turbine, and holds the world's record for helicopter speed—156.005 m. p. h. A companion model developing 280 h. p. gives exceptional performance to the latest turboprop fixed-wing plane. . . . Two other C. A. E. turbine models—the J69 turbojet and the TC-104 air generator—also are making good on important assignments. The former, powering the Cessna T-37 twin jet trainer and the Ryan Q-2 Firebee target drone, has future promise, too, as auxiliary power for large planes. The latter is the nucleus of the MA-1 portable starter unit for large military jets, and is already in production at C. A. E.

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REMEMBER THIS ?

The year is 1921, the plane is an old Boeing GA-X ground attack plane and the daring pilot at the controls is Harold R. Harris, now president of Northwest Orient Airlines. Harris then was chief test pilot for the Army Air Corps. Others in the picture include, from the left, A. S. Inspector Hearn, unidentified, W. E. Boeing, Egtvedt, Gott, Johnson, John Wilson, A. S. pilot Harris, sergeant in charge of hangar guard, A. S. chief mechanic Wickstrom, Richards, unidentified, Huckle and A. S. engineer N. Kearney. The saying went that the GA-X was so slow that it would be vulnerable to ground fire from all weapons up to and including the French "75". The armor-plating made flying the machine much like sitting inside a large drum with people pounding on the outside. Gen. Harris was Chief of the Army Air Corps flight section from 1920 to 1925. At one time, in 1926, he held 13 world flying records. He was chief of staff of ATC during World War II.

Toward a Light Plane For Everybody

(Continued from page 19)

snap rolls and over-the-top spins are executed with ease. The landing approach and flare-out are normal in speed and attitude, and as soon as the *Champ* pays off, it breaks clean and stays on the ground—no floating.

What is the Civil Aeronautics Administration's reaction to this experimenting? Well, they have recognized the trend. From many parts of the nation, CAA safety agents have noted an upsurge of interest in amateur designed and built aircraft. Thus present regulations are encouraging to home builders and afford them opportunity to build so long as the experimenter uses approved construction methods and operates the aircraft in accordance with existing regulations.

For those who are building or planning to build their own plane, the CAA offers the following tips:

Acquaint the local CAA safety agent at the start of the project. If he is to certificate the airplane later, he must be familiar with the plans and materials, and examine the workmanship at various stages of construction.

Educate yourself in the basic principles of good design and construction. Study CAA Manual #1. This manual, which can be obtained from the Government Printing Office, Washington, D. C., for $1, describes the broad standards a home-built aircraft must meet.

Also recommended is a study of appendices A and B to CAA Manual #8. This material was prepared for application to aircraft in the restricted category, but applies equally well to amateur or home-built aircraft. The cost is 60 cents. Another helpful aid is CAA Manual #103 entitled "Aircraft Design Through Service Experience." Price is $1.25 and copies are available from the Government Printing Office. END

Scater

(Continued from page 30)

identification, interception and *destruction* must be *less than the time* required by enemy aircraft to proceed *from the point of detection to the bomb release point!* The intermingling of friendly "unknowns" radar tracks and suspected or hostile radar tracks creates an impossible defense situation. At such a time, possibly all aircraft other than known defensive forces may have to be considered suspect and unless the time mentioned above permits clarifying the situation, drastic military action may have to be taken without further delay.

Current restrictions for ADIZ's may have to be extended from time to time as found necessary in the public's interest. So far to date the military have succeeded in keeping this policy to its strategic minimum. It also may be necessary to limit all point-to-point traffic within such areas to the identification capability of the air defense system. For this purpose, a priority listing of categories has been developed by the Defense Air Transportation Administrator for civil aircraft. This would NOT likely occur except during periods of extreme uncertainty. It will be interesting to note

that so many types of civil air operation are classified as necessary to the war effort, that only pleasure flying will constitute the major portion of the restricted traffic.

The World War II requirements of designated corridors and position reports may be revived, if required. Local, civil air traffic may again be permitted to operate in designated areas subject to certain visual notification procedures.

In the event of WARNING YELLOW, the CAA may, as the urgency of the situation demands (as indicated by the Air Defense Commander) ground all aircraft not specifically exempted by the ADC until the situation clarifies. He may additionally direct all in-flight traffic, in or approaching the affected areas, regardless of whether in an ADIZ or not, to land at the nearest suitable airport if possible; or divert the aircraft *away* from the route, or suspected point of attack. He may order the shutting down of most or all air navigation radio aids in the affected areas. However, certain key aids *might* remain in operation for the time necessary for ATC to accomplish the landing or diversion of friendly aircraft.

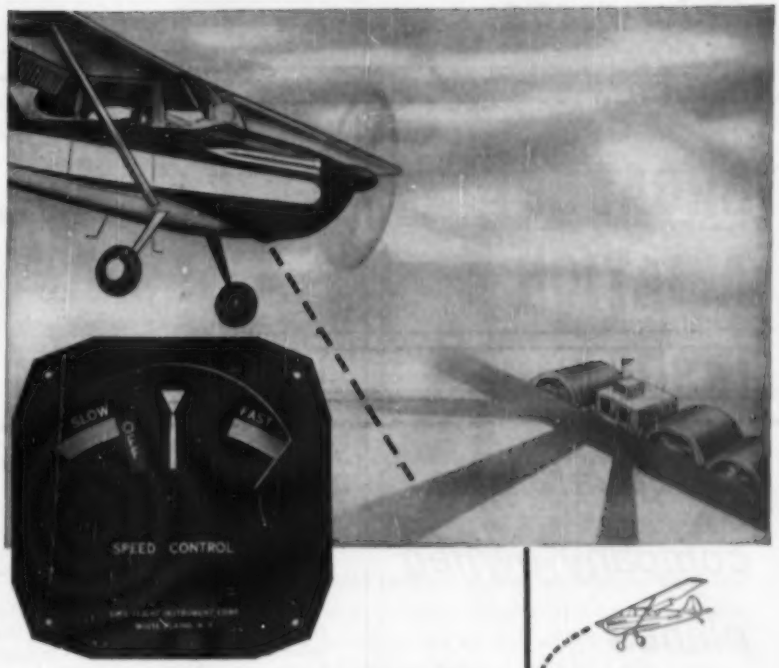
The essential difference between WARNING YELLOW and WARNING RED is in the time element and the degree to which the above measures may be instituted. It is readily apparent that the potential of the threat to the general public welfare and the country's survival far outweighs the inescapably serious but solely personal threat to individual civil aircraft that do not take immediate action to comply with the specified instructions.

The sponsors of SCATER assure that, insofar as the military situation permits, all grounding of traffic during such a period will be of as *short duration as possible*. Also, that every effort will be made, that can be militarily justified, to delay the shutting down of radio aids and other facilities in order to effect the safe landing and diversion of aircraft.

Air Traffic Control agencies have been briefed and trained to cope with the obviously difficult separation and control problems that will immediately ensue. It is not likely that radio aids and facilities would be cut off without any word of warning, although this could conceivably happen under conditions which ADC deemed mandatory and under which the employment of those aids by an enemy would outweigh any consideration of their usage by civil aircraft.

With airborne radar navigation developed to its present stage, it may soon be that the shutting down of radio facilities will be as futile a gesture as the French Maginot Line technique. But for the present it must seem to the military that the CONELRAD and SCATER plans are vital to our security.

And similar to the CONELRAD plan, whereby commercial broadcast stations, can function for public notification without jeopardizing our security, a plan may sometime be announced whereby navigational facilities for development and dispersal of civil aircraft can be accomplished without rendering navigational assistance to the intruder. END



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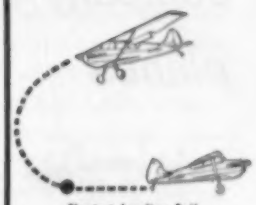
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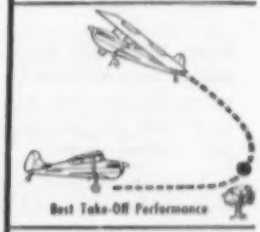
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the GREMLIN CORNER

By WEYMAN S. CARVER

I WAS APPLYING wax to Pegasus when I heard Dopey exclaim, "Hah!" in a satisfied tone of voice.

Psyke looked at Dopey who was busy punching holes in the elevator of "Pasture" Pete's airplane which was parked next to mine.

"Pasture" Pete was the Gremlins' favorite customer and had gotten his nickname from making so many landings in spots other than airports, due to gremlin work.

"Stop that!" I yelled at Dopey who had four small holes punched in the fabric. I pulled him off the elevator by the seat of his pants.

"Let me down," Dopey yelped. "The fabric's rotten and it's supposed to have holes in it."

Pitot, Sludge and Kilo came scooting under Pegasus to find out what the trouble was.

"Can it, you guys," Psyke said, "here comes Pasture Pete."

Pasture Pete roared up in his car, slammed on brakes, and skidded to a halt a few inches from Pegasus' tail. Dust rolled over Pegasus.

"Hey, I just waxed that ship," I said, as Pasture Pete leaped out.

"Don't be an old maid, Mac, I'm in a hurry," Pete said.

Pasture Pete rushed around to the trunk of his car and pulled a wooden box out. He got it up in his arms and staggered toward his ship.

"Full of nuts and bolts," he panted.

"Open the baggage compartment for me," he said to me. But the gremlins were way ahead of me. Dopey already had the compartment open. "Never mind, it's open," Pete said.

"Dopey opened it," I said, as he heaved the box of nuts and bolts in.

"What did you say?" Pete asked, as he turned around. I had forgotten that he could not see the gremlins.

"I said some dope must have opened it," I replied. "How much does that box weigh?" I asked.

" 'Bout one-fifty," Pete said.

"You can't fly with that much weight in the baggage compartment," I said.

"Nuts," Pete said as he climbed in his ship. "I've got room to spare."

"It isn't the room, it's the weight," I yelled, as Pete got the engine going.

"Why don't you shut up?" Psyke said to me.

The gremlins' little green eyes were sparkling like diamonds and they were pushing against Pete's landing gear to help him get moving.

"Your center of gravity is too far aft," I yelled, as Pete slammed the door.

Pete revved up the engine and the little ship moved slowly forward.

"We got 'im this time," Kilo crowed happily.

They scampered out in front of the hangar and climbed up on the bench to see better. I followed them.

Pasture Pete taxied out on the runway and opened up the throttle.

"Maybe he'll make it," I said hopefully.

"Kill joy!" Dopey said.

Pasture Pete was two thirds of the way down the runway and seemed to have plenty flying speed. The ship staggered up from the runway as its prop screamed for air. It wallowed along about three feet above the runway with the nose high.

"He's going to make it," I said.

"Come on fence," Pitot said. He was down on his knees in an imploring attitude. "Come on fence," he said again.

The airport boundary fence was about a hundred yards from the end of the runway.

The little ship wallowed up another foot. It was like watching a slow motion movie. The gremlins were all on the edge of the bench leaning forward.

Pasture Pete's ship staggered beyond the end of the runway. It looked like he would make it.

Just as he got to the fence, the little ship's tail swung down and crashed into it. Then the nose flipped forward and slammed into the ground. The landing gear folded under, the prop splintered, and the wings crumpled as it slid through the underbrush.

The gremlins led as we ran for the wreckage. When I arrived panting, they were standing happily surveying the debris. Pasture Pete was sitting in the middle of it cussing the aircraft manufacturer.

"They manufacture one lemon in 20 years and I buy it," he grumbled.

"All this wreckage just because a guy didn't know about weight and balance," Dopey said happily.

"Yeh, some guys never get the word," Sludge said. END

Training Keeps Pace

(Continued from page 17)

get instruction and practice in formation flying, radio and celestial navigation, cruise control and the like.

In basic training students continue to develop precision, judgment and all-around flying proficiency. After the 50 additional hours in the T-28, single-engine trainees step into the T-33 jet. The multi-engine boys following primary start right off in the TB-25, in which they will fly a total of 110 hours. Under the old program, multi-engine students flew 40 hours in the T-28 before converting to the B-25 for 80 hours of twin-engine training.

Upon completion of the five months basic course, cadets receive commissions as officers, and are awarded their Air Force wings. During training the cadet is paid $105 per month, plus subsistence. As a second lieutenant, however, the newly rated pilot immediately has an income of more than $5,000 a year, as well as the allowances connected with rank and flying status.

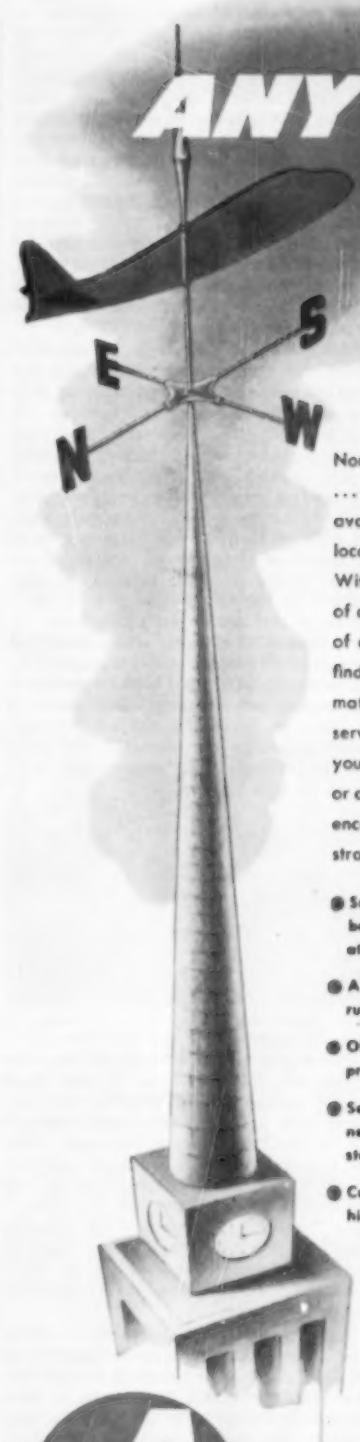
Once commissioned, student officers proceed to the third and final phase of their flying training—advanced, taken at bases in the Crew Training Air Force, one of the three subordinate training divisions of Air Training Command. Other ATRC Divisions are Flying Training Air Force, which administers all primary and basic pilot training; and Technical Training Air Force, which qualifies officers and airmen in specialties other than flying.

During training, students fly planes that have written recent history—fighters, interceptors, medium bombers. Single-engine men pilot such jobs as the F-86, F-84, the all-weather F-94, the rocket-armed F-89, and others. They learn how to operate as a team, and how to fly their plane as a weapon. Special emphasis is placed on tactics, gunnery, rocketry, bombing and interception. Finally, the qualified combat pilot is ready for assignment to a tactical organization according to the type of specialized advanced training he has received. This advanced training lasts between 10 and 16 weeks.

First primary school to implement the new T-34 and T-28 aircraft in the training program was Marana Air Base, Ariz., operated by Darr Aero Tech. The change-over began in May of last year. Though beset by obvious technical problems attending such a complicated undertaking, Marana phased out obsolescent trainers in stages, replacing them with new types as each of four successive classes entered training, until the last T-6 was finally retired.

Hawthorne School of Aeronautics, operating Spence Air Base at Moultrie, Ga., commenced to change aircraft last September and soon thereafter Southern Airways School at Bainbridge, Ga., and California Eastern Airways at Mission, Tex., started flying the new planes.

Consensus of all contract school operators is that use of the new aircraft constitutes a big forward step in Air Force pilot training. Instructors and maintenance



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nance personnel alike are unanimous in their enthusiasm over the revised program—morale is higher than ever before.

The "big step" in the evolution of military flying training started in 1947 when the Air Force became an independent service. The Air Training Command, born of wartime necessity, was then four years old. Up to the time Japan surrendered, ATRC had trained 250,000 combat pilots, but at war's end flying training ceased because of the large surplus of experienced fliers. However, retirement, physical incapacity, relief from active duty and other factors soon saw that surplus dwindling.

Anticipating a shortage of qualified pilots, the government opened up the program anew in 1946, and training policies came in for major overhauling. In October of the following year the primary course was eliminated and with it the reliable old PT. Beginning in 1948 cadets entering the program commenced training in the basic phase, starting right off in the T-6, a plane previously classed as an advanced trainer. Basic was extended to eight months to compensate for the elimination of primary.

Also in 1948 ATRC got a new boss—Lt. Gen. Robert W. Harper, who retired last June after 30 years service. General Harper promptly instituted broad reforms in all aspects of training. He made a scientific study of the subject. Always stressing quality, the former ATRC commander brought his educational programs to new heights.

At the time war broke out in Korea, ATRC had been considering the feasibility of reviving contract flight training. Now faced with problems of rapid expansion, combat needs and limited personnel, the Air Force speeded negotiations with civilian flying schools, asking them to do a job similar to the one that 63 schools had done during World War II. By late 1952 nine contract schools were operating; today they provide *all* primary training for the Air Force.

The initial phase of training was redesignated "primary," as it had been known during World War II, but students still started their flight instruction in the T-6. Then in February, 1953, the course was revamped again and the Piper PA-18, linear descendent of the famous *Cub* series, entered the picture as a "screening" airplane. Its purpose was to help instructors detect possible disqualifying defects, such as air sickness and fear of flying, before students began flying the T-6.

It never had been intended to utilize the T-6 as a "standard" post-war trainer. By 1948, ATRC was shopping for an integrated primary-basic trainer to be used for all instruction up to the advanced stage. This turned out to be the T-28, first new trainer built since VJ-day and first U. S. trainer to have a tricycle gear.

Powered by an 800-hp Wright R-1300 engine, the T-28 cruises at 190 mph, or about 30 miles an hour faster than the T-6. Its rate of climb is over 2,000 fpm. With a normal gross weight of 7,463 pounds, the T-28 is about 1,800 pounds heavier than the T-6. A new Navy version, powered by a 1,425 hp Wright R-

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1820 mounting a three-bladed propeller, which gives it a top speed of 346 mph, is currently in production.

However, the T-28 is certainly not a beginner's airplane and the need for a beginner type that would combine economy of purchase and operation with good performance, was recognized. The *Mentor* was selected. Powered with a 225-hp Continental, the *Mentor* cruises at 170 mph with 60 per cent power, compared with the PA-18's speed of 105 and the T-6's speed of 160. It has an initial rate of climb of 1,200 fpm and a maximum diving speed of 280 mph.

That the change in Air Force flying training has been a step in the right direction is already apparent. Marana noted that during the time all primary training was conducted in the T-6, the elimination rate for flying deficiency was 22.6 per cent. When the PA-18 was incorporated with T-6 training the rate dropped to 10.5 per cent. With the integration of T-34's and T-28's, however, only about seven per cent of students are washing out. Primary attrition for all reasons, incidentally, is less than half of that in World War II.

The T-34 and T-28 have flight characteristics similar to the T-33 which the student will fly in basic. Cockpit arrangement, almost perfect visibility, tricycle landing gear and procedures are very near like the jet. As a result, a smoother continuity of training, from primary through basic, is possible.

Instructors can now spend time developing student pilot abilities, rather than use precious hours teaching special techniques to offset the critical habits of the T-6. Ninety per cent of all training mishaps occur on landing. The ease with which students can maintain directional control in tricycle-geared planes will virtually eliminate the notorious ground-loop. Despite high utilization of training aircraft in primary—each school flies more than 10,000 hours a month—the accident rate is the lowest in history.

Phasing in new trainers also has meant changes to the primary curriculum in order to adjust the syllabus to the new type aircraft. Academic subjects that are not applicable, such as the one on turbo-superchargers, have been discarded. Lessons on electrically-operated instruments replace those covering suction types. The radio communications course is extended since students now get radio procedure when they start to fly. Because speed and range of the new planes are greater, cross-country flights are correspondingly longer, placing more emphasis on the rudiments of navigation. The amount of primary aerobatic training is doubled, but all maneuvers that induce negative "G" loads, such as slow rolls and the half-roll-and-reverse, have been deleted. Pilots don't fly that kind of maneuevers in jets.

Introduction of jet trainers in primary schools acquaint the prospective pilot with the complexities of turbine craft at an early stage and should effect substantial reduction in training time and expense. From all indications, the T-37 is ideally suited to accomplish this purpose. A 350 mph airplane, it has a design gross

Briefings . . .

(Continued from page 10)

tubing, connections, cylinder, and labor is $310.50.

SEARS AND ROEBUCK now have an anemometer on the market, giving wind velocity (and direction by vane) at a remote indicator, for $14.95. The device can be mounted on towers, poles or roof tops.

NAVY HAS TERMINATED an order for over 200 McDonnell F3H *Demons*. However, a substantial number of *Demons* are still on order and the company has a backlog of work including production of Air Force F-101 *Voodoos* and experimental work on airplanes, guided missiles and rotorcraft. It also has a Navy development contract for a new advanced all-weather attack fighter.

WHEN JOHN FISHER of Muncie, Ind., flew into the airstrip near Grand Hotel at Point Clear, Ala., for the Fall Cruise rendezvous of the Sportsman

Pilots Association, he easily took the prize for the largest plane load with five of his children, a niece, Mrs. Fisher and her sister. More than 40 planes flew in for the three-day program.

FLYING THE PACIFIC JET STREAM on scheduled non-stop flights between Japan and Hawaii for the third successive season, Pan American World Airways encounters tailwinds averaging as much as 133 mph and on one flight a velocity of 175 mph was recorded.

REMMERT-WERNER recently made the first commercial installation of the new Bendix RDR-1 Airborne Radar System for business aircraft. It was made in a DC-3 belonging to Cornell-Dubilier Electric Corp., of South Plainfield, N. J.

FIRST TWIN-JET bomber trainer to be available to Air Force pilots will be Martin's B-57C. The company already has produced quantities of the B-57A, a test vehicle, and the RB-57, a reconnaissance aircraft now in service. It is presently producing the B-57B, high performance light bomber with special qualifications for night interdiction missions.

CAPT. WALTER R. BULLOCK, pilot for Northwest Orient Airlines, recently

logged his 25,000th hour of scheduled flying time. He has another 4,000 hours in his own planes, making him the "flyingest" pilot now active in the industry. Capt. Bullock, a hale and hearty granddad of 55 summers, learned to fly at the old Glenn Curtiss flying school at Newport News, Va., in 1916.

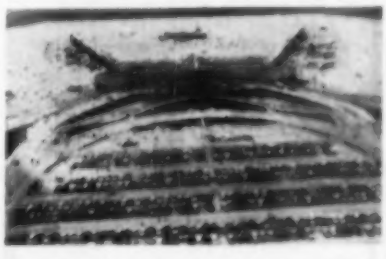
PARKS COLLEGE reports that the majority of students enrolled for its 45-week A & E mechanic rating course indicate a desire to work for a fixed-base operator upon completion of their studies. Good news for many operators who have been unable to get mechanic help.

NO MATTER WHERE YOU TRAVEL in the free world, if you go by air the chances are better than six out of seven you will fly in an airliner designed and built in the United States. A recent survey shows that 86 per cent of all commercial air transports in use throughout the free world were built in this country.

WHEN AN AIR FORCE installation recently completed 100,000 hours of training in a flight simulator, it was determined that this ground training was the equivalent to flying 15 million miles at 150 mph in a twin-engined transport type aircraft.

AERO PUBLISHERS have announced availability of their new 1954-55 catalog of aviation books and equipment. Listing the books of more than 100 publishers, including the Government Printing Office, the catalog is free and can be obtained by writing to Aero Publishers, Inc., 2162 Sunset Blvd., Los Angeles 26, Calif.

HOUSTON DEDICATED ITS NEW $5 million terminal simultaneously with the Second Annual Houston Jaycee Air Show.



Headline attraction for the show was the Navy's precision jet aerobatic team, the

(Continued on page 68)

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(Continued from page 61)

weight of 5,600 pounds, about the same as a T-6, and nearly twice as heavy as the T-34. Twin turbo-jet engines provide additional safety and wider range, which is "over 800 miles." Each of the power units is rated at 920 lb. thrust. Wing span is 33 feet. The T-37 is equipped with ejection seats, jettisonable canopy, electric trim tabs, and hydraulically actuated speed brakes. As USAF's first side-by-side trainer, the change from tandem seating is aimed at increasing instructor efficiency.

As this is written, it appears likely that first schools will get jet replacement trainers by early 1957, if training evaluations proceed on schedule. When the change-over does occur, the primary course will probably be stretched out to give cadets more flying time in the T-34 before they go into the proposed jet trainer.

As this issue of FLYING goes to press, evaluation of the TF-86, designated a "trans-sonic trainer," is nearing completion. Retaining most of the performance characteristics of the original F-86, the trainer is rated in the 650 mph class. Preliminary TF-86 evaluation was made at Craig AFB, Selma, Ala. The plane was then taken to Williams AFB where six student officers, newly graduated from the primary school at Marana, were flown 10 hours each, to study their transition reaction from the T-28 directly into the TF-86, without intermediate T-33 time.

Up until now, student officers have had two to three years left to serve in the Air Force after completing basic pilot training. Due to the complexity of newer aircraft and the cost of training to fly them, entrance to advanced training has been limited to special categories. Pilots who enter advanced training will sign up for four years active duty.

Air Training Command has come a long way since World War II. Now the largest command in the Air Force, its personnel of 240,000 is scattered over 42 military training wings, technical and flying schools located in 15 states. It has 5,800 aircraft, including every type in the Air Force's operational inventory. Among its planes are 2,300 jets, from the T-33 to the Boeing B-47. Its subordinate air forces fly more than a quarter-million hours a month. And in contrast to the 800 new pilots graduated in 1948, ATRC today is producing 6,000 a year to support America's rapidly growing jet Air Force. END

I learned about flying from that

(Continued from page 38)

or two of food. File a flight plan when flying over sparsely settled country. And never, never wait too long when in doubt about a 180.

The cost of my carelessness was my airplane, since the expense to move it out was prohibitive; and a long, hot, dry walk. That is a rather stiff lesson in the folly of carelessness and in not having "the word." END

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I Treat 'Em Rough

(Continued from page 22)

heat condition then changes in short order when the airplane begins its take-off and leaves the ground. Cool air in volume then commences to flow over the cylinder and rapidly carries away a good portion of the heat. The cylinder walls cool and contract more rapidly than the pistons. This induces excessive wearing and some scouring of the cylinder walls. Extreme variation in heat conditions can cause an engine to lock tight on take-off.

Whether or not my views registered with Tom, I was not sure. He did not have much to say on the subject while we rode to the dock and climbed aboard his boat. We trolled north of the island and came up with some 18-inch, walleyed pike. After filleting the fish, we packed them in ice and rode out to the airport. This time Tom was in the left-hand seat. He started the engine and taxied to take-off position.

"What's this procedure you follow?" he asked, after swinging the plane into the 45° position. But before I could answer, he said that he recalled it. Running the engine up to 1,500 rpm he checked both mags while also watching to see that oil pressure remained steady, and was near the normal reading for cruise. The engine ran smoothly, even though oil temperature and cylinder head temperature were below the green. Then he retarded the throttle before accelerating to 1,900 rpm's. There was no sputtering or coughing. He repeated the accelerating test to double check. Same engine response.

"When do you check full throttle run-up?" Tom called above the noise.

"As we make the take-off run and have the proper volume of air over the cylinders. I usually check this soon after the airplane is rolling so that if the engine isn't turning up properly, I can chop the throttle with plenty of runway still in front of me."

Tom grunted something and started the airplane down the runway. I noticed his eyes flick from the runway ahead to the tach and then back again. He did this several times. Apparently satisfied with the engine's performance, he did not chop the throttle and we climbed away.

"You know, this new engine treatment is a little difficult for me to accept—it goes against some of my old training."

"That's exactly the way I felt at first," I confided, "but after digesting the facts, I sensed that my 'old training' was exactly that—old—out of date. Excessive ground time on today's light plane engine can grind off many hours of service, and I intend to prevent that from happening to the power plant in my airplane."

After our flight home, I did not see Tom for several days. One afternoon I arrived at the airport just as he started the engine of his Cessna 170B. As a matter of curiosity I timed him until his take-off. It took four minutes for him to reach the take-off position. In the following seconds he checked mags, accelerated the engine twice and then took-off. My chronograph read four minutes and 40 seconds. END

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AIRCRAFT SUPPLIES

Rabbit Trap

(Continued from page 23)

at 140 mph. Jet, cable and chain headed for the rice paddies bordering the field. Then, in less than 300 feet, the streaking fighter-bomber was dragged to a stop. Damage to the plane was slight. The pilot was not even shaken up, except mentally after he discovered the arming wire on one of the bombs was pulled.

The following day a Major from the same fighter wing blew a tire on his F-84 just as he was ready to become airborne. He hit the center of the barrier so hard that all but three feet of the chains were unwound—requiring a force of 40,000 pounds. Not too confident about the newly installed barrier, the Major was prepared to retract the landing gear and take a chance of sliding to a stop on the belly. However, before we should hit the gear switch, he was stopped. The damage was so small that it wasn't even reported as an accident.

Cost-wise, the "rabbit catcher" has proven a gold mine. Without even considering the pilots saved, over $2,000,000 worth of plane damage was avoided. Each set costs $10,000. New webbing which is installed after each "catch" costs $60. The anchor chains, produced in Osaka shops, cost about $4,000 per set.

Air Force planners hope the Rabbit Catcher can eventually be used on all runways limited in length. It may also be used to replace the brake parachute which stops jet bombers at present. The barrier would be cheaper to operate.

At any rate, it is one trap that the "rabbits" are glad to be caught in. END

DYNAMIC TEAM

Edward H. Heineman, chief engineer of the El Segundo Division of Douglas Aircraft Company, Inc., beside the finished product of his latest design, the A4D *Skyhawk*, mighty midget bomber. The eminent aeronautical engineer called the A4D a prime example of his concept of more and better airplanes at lower cost to the nation's taxpayers. The *Skyhawk*, a fixed wing Navy carrier plane, is America's smallest and lightest jet aircraft, yet is faster than many jets twice its size.

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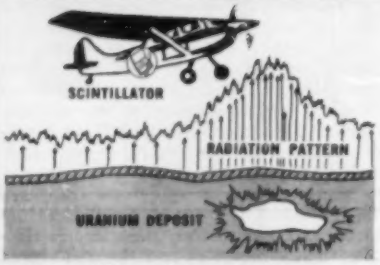

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Bewildered Bear

(Continued from page 25)

Yakutat. This again involved miles and miles of open water, crossing occasional islands, with few bearing any sign of habitation. One feels so alone and detached from civilization on a trip like this. We tried in vain to ease our concern by referring to the saying of a good friend back home, "Why worry when flying over any rough terrain; after all, the engine doesn't know the difference."

The last hour of flying was going faster than at any time during the entire flight and, as we approached the final hundred miles, our anxiety about weather and landing spots was forgotten. There were majestic snow-covered mountains and spectacular glaciers to watch. Miles of flat muskeg interspersed with clumps of alder trees, and streams which, from our low altitude, could be seen to contain schools of spawning salmon. Circling a stream to closer observe them, our attention was drawn to something moving across the open flat-land. Al said, "Look! look! it's a bear! A monster!"

And what a temptation this was. Had such a chance presented itself in the States, we would have watched the creature from a safe altitude and continued on but, here in the wilds of Alaska, with no life or property endangered, it seemed a different proposition. We just had to get a close-up look at that bear.

Diving down back of him, we headed for the huge posterior that seemed to weave and roll with a peculiar hitching motion that made us both laugh. Pulling up after practically dusting his ears with our wheels, we turned to see what kind of an impression we had made. He had reached up on hind legs and looked as big as a horse with head swiveling from side to side, puzzled about what was happening. His perplexity was comical. Completing a wide turn we made for him again, this time flying head on.

The full realization of his enormous size was quite obvious now as the gap between us rapidly shortened. Our path over the tall grass was actually at a level that required a pull-up to miss hitting him. Putting the ship in a skid after clearing the bear, we saw him still standing erect, roaring and slashing with huge hooked paws at the empty air about his head, still facing the direction from which we had come. "Man, he sure is hopping mad," exclaimed Al, as we returned again, flying slowly this time and a bit to one side for closer observation. Whether the bear was enraged and itching for a fight, or completely bewildered is pure conjecture. In any event, the ol' boy was upset. Flying close enough to look right down his throat, we could see the drool rolling down his chest and hear his jaws snap. Those teeth looked like the business end of a pitch fork.

As we circled him with reduced power, he finally saw he had nothing to fight, dropped to all fours and started across country heading for the alder growth. Intercepting him by flying between him and his objective, he again rose to follow us with those blazing eyes and flailing

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arms. On all fours, a large hump was noticed on his back at the front shoulder line. This hump, we were later informed, was the sign of an old bear. Eventually Bruin disappeared into the alders, probably to tell his confréres that he had seen the biggest darn eagle that ever flew and have them laugh at him for another of those "flying saucer" yarns.

Our bear hunting was over. A glance at the fuel gages told us we had tarried long enough. Al and I had been thinking the same thoughts. What if the engine had conked out? That king-size grizzly could have knocked that *Cub* into kindling with one swipe. "I'll bet that's the biggest bear and the smallest airplane that ever got together in this country," Al hazarded.

"I'll bet I wouldn't go near that grizzly without an airplane for all the tea in China," I replied. But neither of us will ever forget what an enraged Alaska grizzly looks like from six feet overhead. It was worth the chance of a conked engine.

END

I Flew at Dien Bien Phu

(Continued from page 27)

recall among our drop articles was a D-8 bulldozer. The last day over D.B.P. was my toughest from the standpoint of personal feelings. "Earthquake" McGoon, a legendary pilot out there, and my sidekick Wally Buford got hit so bad over target that, although they managed to keep their C-119 airborne for 50 miles on the way home, she finally stalled in.

On the morning of May 7, '54, Dien Bien Phu fell and we began dropping to targets in the far-flung outposts in the jungle mountain areas. With a handful of others, I was sent to a base near the village of Tourane, about 300 miles south along the Viet Nam coast. There we quartered with a French Engineering outfit and a contingent of the Foreign Legion. Every evening after dusk the Commies would attack as regular as clockwork. The burp guns would chatter and the grenades pop till the Reds were repelled, after which we would go to sleep. Our only armament was a 9 mm. Swedish pistol but at times it served a good purpose. None of our little pilot group got killed or captured by the raiders.

When Dien fell, the Reds started a program of stirring up riots in any and all native villages elsewhere. To help quell this program, we started flying small ammo and other articles all over the country . . . as far north as Hanoi and as far south as Saigon. On one occasion we flew up to Okinawa and brought back 20 tons of tear gas bombs for use against rioters. Where our average mission against Dien Bien Phu had been three and a half hours, our missions now varied from many hours to a few minutes. I had one drop hop which took me only eight minutes from our fortified base. And what a variety of country we covered! No walking out from a forced landing in a lot of that country. And while weather is weather wherever you find it, the monsoon season is something special. With water wings you could

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swim in some of those rain clouds.

From time to time the number of pilots in "Operation Squaw," the designation of the Indo-China airlift project, was varied. By the time the project was concluded with the final six missions between Tourane, Saigon and Hanoi, there were only two of us left, Harold Hudson, a regular CAT pilot, and myself. Originally there had been but four of us volunteering from the States, with a few more following. The majority of the pilots on airlift were seasoned CAT veterans.

Since World War II, when as a kid I spent two years with the Air Force in the South Pacific, I've flown with both scheduled and non-scheduled airlines . . . Panagra out of Lima, Peru; National out of Miami; with Trans-Ocean on the Tokyo Airlift; with the Cuban Airfreight Line; ferried for the Ecuadorian Company in the West Indies; managed the airport at New Holland, Pa.; instructed for Embry-Riddle; and done a lot of special projects. But don't jump at conclusions. None of it was for adventure. All of it was for experience whose pieces I am to put together. And there was no more valuable piece than that of flying the weather, terrain and problems of Indo-China with CAT.

For whatever it may be worth, my opinion on the outlook for the future of Indo-China is that the country can scarcely fail to be taken over completely by the Reds. The extent of infiltration there left no doubt of this in the minds of us who carried out "Operation Squaw." Before we left Indo-China, complete divisions of Viet Nam troops had turned over to the Commies, as had thousands of civilians. What else could they do after the French debacle? On the other hand, many will leave the country. CAT presently has another airlift contract, evacuating troops and civilians from the northern area of Viet Nam to the south. It is not a happy assignment but at least it saves some free men for the freedom they value beyond the rewards of appeasement, or from the fruits of mental sloth which lead to moral and spiritual, if not physical, slavery. END

Light Plane Utility

(Continued from page 29)

second magnetic compass is used for a standby, or primary on cross-country flights to save the battery.

The small Grimes Navigator is very useful when working in near the station. Last fall while on a business trip, I had to make an IFR approach at Griffiss Air Force Base, Rome, N. Y. ATC required holding southeast of the Utica range station in the usual race-track pattern, for 45 minutes, until ceiling and visibility came up to minimums. Every time the airplane came up on the Range Station, I set the Navigator pointer to zero miles and it gave a fairly good distance in miles from the station. By setting the final approach speed knob to 90 mph, the Navigator clocked off the distance in miles from the range station to the airport. However, for this work the unit could be improved

(Continued on page 69)

RESOLVED MOODBEAMS #2

In making New Year Resolutions, why not string along with Yvonne Erwin (21, 5'7", 118 lbs., brown eyes, brown hair), MISS TEXAS OF 1954? She has tasseled a tip to remember what she disremembered last year — whatever that was — and, with a woman, who knows? With a pilot, tho, it may have been Southwest Airmotive de-icing, anti-icing, or heater service. Resolve now to profit from SAC's extra margin of safety and reliability in new installations, periodic checks, and repairs!

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Briefings . . .

(Continued from page 61)

Blue Angels. The Texas city ranks 8th in the nation for air passengers per capita.

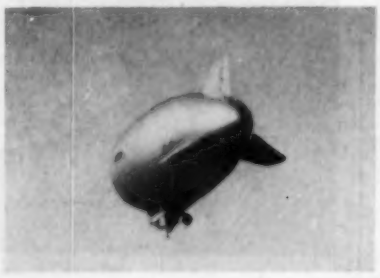
OFTEN MISTAKEN FOR FLYING SAUCERS, approximately 800 balloons per day are released in the United States to measure weather elements aloft. Balloon observations are taken four times a day from almost every government and military weather station.

NAVCO, distributors of parts, radios and supplies for business aircraft, has moved into new air conditioned sales room, office and shop at Lambert Field, St. Louis.

LOCKHEED'S C-130 TURBO-PROP military transport has been officially named *Hercules*. It follows the almost invariable Lockheed custom of christening its aircraft for stars, constellations and other astronomical phenomena. The name was among the 9,483 employee suggestions made for the new freighter.

TRAVEL AGENTS ARE RESPONSIBLE for close to three-quarters of a billion dollars' worth of business a year with the world's airlines, according to Ralph S. Damon, president of Trans World Airlines.

COASTLINE AERIAL DEFENSES will soon be augmented by an undisclosed number of Goodyear XZS2G-1 airships, newest addition to the Navy's anti-submarine



warfare team. Unusual feature is the craft's inverted "Y" configuration of three stabilizers and control surfaces on the stern. Flight controls are subject to manual or automatic pilot operation. Airships will be manned by a crew of eight officers and men.

SPACE TRAVEL IS GOING TO COST real money, according to D. C. Romick, of the American Rocket Society. It's 238,857 miles to the moon. At commercial plane first class rates of six cents a mile, that would be a one way fare of $14,340 and a round trip of $28,680. There will be no time problem—the moon would be only 3½ days each way.

THREE UNITS OF VOLSCAN, revolutionary air traffic control system, will be installed at military air bases in the U. S. An electronic device. VOLSCAN exercises long range control over incoming aircraft, directing them to the point of final approach, where they either land visually or use GCA or ILS. It is said to virtually eliminate "stacking" over airports.

A SIX-JET BOMBER recently flew the equivalent of 15 times around the world without overhaul of any of its six engines.

THE "ORDER OF THE BUSTED PERISCOPE" was presented to Lt. (j.g.) Charles O. Paddock in honor of his marksmanship in a practice bombing. Spotting the periscope of the USS *Toro* during an anti-submarine drill off the Maine coast, he dropped a 13

pound practice bomb and hit the periscope, a target only three inches in diameter, square on the head. A plaque bearing the "eye" of the submarine is presented above by Lt. Cmdr. W. O. Hudson, II, left, Commanding Officer of the *Toro*. Lt. C. E. Bennet, right, looks on.

LARGEST CONTRACT FOR OVERHAUL of aircraft engines to be placed by the Air Force has been awarded Dallas Airmotive. The company will overhaul some 300 Pratt & Whitney engines a month for Air Force transport planes.

GUY M. MILLER, owner of Miller Aviation Center at Pittsburgh, Pa., has been elected president of the National Air Taxi Conference, succeeding Walter R. Laudenslager of Red Bank, N. J.

HALF A MILLION AIRPLANES have been produced in the U.S. since the Wright brothers built Airplane No. 1. About half of these have been built in the past 10 years, during one of which (1944) a record of 96,318 were produced.

USING DOWNWARD EJECTION SEATS, two Air Force officers set a new record for high altitude parachute jumps by parachuting safely from a B-47 at 45,200 feet. They were Capt. Edward G. Sperry and 1st Lieut. Henry P. Nielsen.

EVERY MEMBER OF THE COMBAT Divisions of the U. S. Army based in the United States could be moved coast-to-coast by America's scheduled airlines in less than four days. Present strength of these divisions is now about 229,800 officers and men in infantry, airborne and armored divisions.

(Continued from page 67)

by changing the dial and speed to 50 miles per revolution of the pointer instead of the present 100 miles and adding a reset push button or lever for rapid zero setting. There is a need for some sort of DME equipment like this, other than a stop watch. A light plane pilot is very busy during final approach and it is easy to forget just where the panel clock hands were, after going over the range or outer marker station.

Another requirement for instrument grouping is to have the omni and localizer remote instrument directly above or below the directional gyro. The panel photo shows both instruments mounted next to the marker beacon light on a separate shock-mounted panel at the left of the wheel. The VHF radio controls are on a separate panel to the extreme right and the LF receiver and loop switches are on the right front of the seat. The instrumentation for IFR flight has been discussed first, because if the panel has been designed for good grouping during periods of high concentration in blind flight, it is bound to result in making VFR navigation very simple to use for cross-country flying.

There are many times when VFR flights can be made above thin scattered and broken clouds at 8,000 to 10,000 feet up in the sunshine, and a pilot can enjoy flight in smooth air, while under the clouds it may be exceedingly rough. On the other hand, many light plane pilots feel they have to see their check points all the time. The flexibility of omni and LF receiver with loop, combined with good heading instruments, I believe, will be of great benefit in overcoming this feeling and easing the minds of such pilots.

In marginal VFR weather, in heavy density areas, tower operators want to know where pilots are, just as much as do pilots themselves. With the navigation equipment listed above, this is not a problem, and the tension of flight is greatly relieved. For example, the ARC-5 low frequency 5-tube receiver with loop, and Dayton Aviation Radio and Equipment Corporation's 22-tube VHF Omni, VAR, and transmitter, are ideal combinations for general navigation between airports. The airplane provisions for approach and let down systems are LF Range, VHF Omni, GCA, and ILS Localizer with 75 MC marker beacon receiver.

In the event CAA's economy drive eliminates the LF Ranges, please note that LF homing beacons are urgently needed for emergency use. The VHF Omni and Localizer stations are not completely reliable all of the time.

In conclusion, I would like to point out that most of the necessary navigational equipment has to be purchased as extras at high cost. Possibly the best way to increase light plane sales is to sell more navigation equipment with the airframe, so that the over-all cost can be less. The main objective should be to provide the plane owner with a machine which will permit him to fly quickly and safely from one point to another, which is far more than providing just the airframes we have been flying in the past. The aviation industry might do well to consider this approach. END

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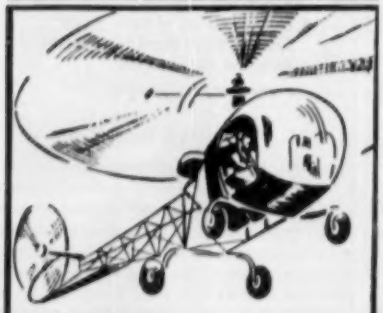

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(Continued from page 33)

climbs at approximately 900 feet per minute, cruises at 205 mph, lands at 55 mph, has a maximum ceiling of 16,500 feet and estimates a range of 435 miles when burning its economic fuel rate of 26 gal. per hour.

Another French jet to be mentioned, which might fit into business utility or adapt itself to the pocketbook of some individuals, is the Morane Saulnier 760. First flown last September, it is a four-place model named the *Paris*, powered with two Turbomeca *Marbores*. This plane, not exactly a light plane but certainly not as large as several private craft in general use, is probably pointed at military liaison in addition to civil executive use. It hikes along at an estimated cruise speed of some 350 mph, although I have seen no cruise speed quoted.

Our American counterpart of the small jet, although likewise not a lightplane, is the Cessna T-37 powered with two Continental J-69 turbines. The "37" is designated as a trainer to be used by Air Force for early introduction of students to jet aircraft. No announcement on the availability of this plane for private use has been made but in due course such development looks like a natural. Air Force reaction to the trainer has been enthusiastic. It clocks better than 350 top speed.

Here at home in my jet lightplane investigation I find another American project—the *Wee-Jet*—now under construction by the Carma Manufacturing Co., in Tucson, Ariz. The Carma factory, located on the edge of the desert at northeast Tucson, gives most of its space to turning out gears, pumps, actuators and other accessories for aircraft and guided missiles. In the same factory, however, work progresses on two all-metal airplanes—a prototype and a static model of the *Wee-Jet* to be used for licensing tests. The *Wee-Jet* promises to be a beautiful little plane—a single-engine, side-by-side, two-seater with a "V" tail. Slightly larger than the *Minijet* (5 ft. more wing span and 5 ft. greater length), the *Wee-Jet* will also have much more power, using a Continental Turbomeca *Marbore* engine with 1,000 pound thrust. This is equiva-

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lent to 1,000-hp at the cruising speed expected.

With a 375 mph cruising speed at 30,000 feet, the plane will have a 1,025 mile range. An oxygen system will permit the pilot to fly at altitudes where the jet is more efficient. Landing speed is estimated at 65 mph. The stress-skin, all-metal plane has a retractable tricycle landing gear.

A look at these various small jets leaves one with the conviction that though the day of the turbine engine for the private pilot is not yet here, the idea is by no means impossible for the future. From an engineering standpoint, the jet lightplane already has arrived. It can and has been built, and the flight characteristics can be made simple enough for the amateur pilot. The 60-75 mph landing speeds of the planes in question are somewhat higher than the private pilot is used to, but the chief disadvantage of the higher speed is to restrict the aircraft to fields with longer runways. They are not the sort of planes one can fly from a short backyard strip. The most important thing, however, is not the speed at which a plane lands but the abruptness of the stall and the general flight characteristics of landing.

The airplanes cited are all powered by Turbomeca engines (Continental manufactures them in this country), and the expense of the powerplant is one of the chief difficulties in the way of private ownership. However, there is hardly anything in the mechanical line which cannot be made cheaper by mass production, and use for small jet engines is not restricted to light jet aircraft.

Public attitude toward speed changes with the years. There was a time when it took a red-blooded he-man to clatter along at 20 mph in an early automobile. Now a grey-headed grandmother zips at 60 without arousing comment unless she slows to 20. Undoubtedly our speed concept will change for aviation just as it has for the automobile field.

Jets for private aviation? It may be only a matter of time. END

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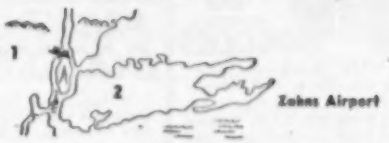

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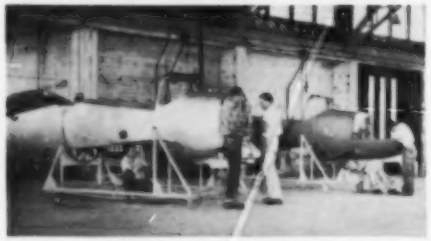
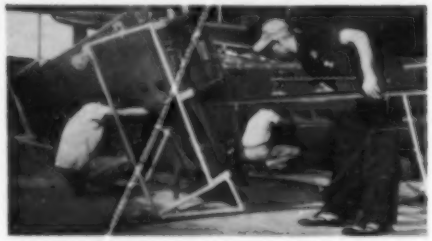
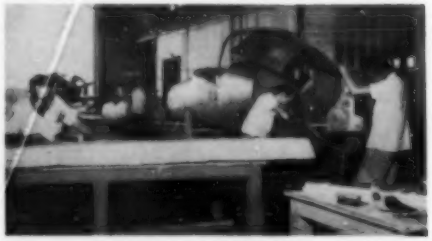


Fuselage Disassembly



Wing Modification



Re-Contouring Fuselage

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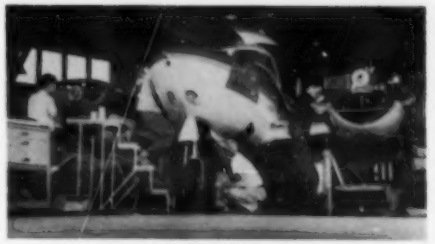

Twin Engine Installation

Final Factory Inspection

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Single Engine Performance